TELEGRAPHIC DETERMINATION

OF

LONGITUDES

IN

JAPAN, CHINA, AND THE EAST INDIES;

EMBRACING THE MERIDIANS OF

YOKOHAMA, NAGASAKI, WLADIWOSTOK, SHANGHAI, AMOY, HONG-KONG, MANILA, CAPE ST. JAMES, SINGAPORE, BATAVIA, AND MADRAS,

WITH THE

LATITUDE OF THE SEVERAL STATIONS,

BY

LIEUT. COMMANDERS F. M. GREEN AND C. H. DAVIS,
AND LIEUT. J. A. NORRIS, U. S. N.,

IN

1881 AND 1882.

PUBLISHED BY ORDER OF

CAPTAIN J. G. WALKER, U. S. N.,
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INTRODUCTION.

The longitudes of very nearly all the prominent positions in the East Indian Archipelago, on the shores of the China and Japan Seas, and the Western Pacific Ocean have been referred by surveyors and hydrographers to one of the following points, viz, Singapore, Batavia, Manila, Hong-Kong, Shanghai, Nagasaki, and Yokohama, the accuracy of the chronometric measurements from these central points to the various capes, islets, mountains, towns, light-houses, and other prominent positions, some three thousand in number, leaving little to be desired, were the longitudes of the initial points exactly known.

Unfortunately this has not been the case. The longitudes of these secondary meridians, which have been accepted for the last forty years, have depended mostly upon observations of moon culminations, made, doubtless, with great care and with the best appliances available at the time, but liable, in common with all such determinations, to an uncertainty of from one to four minutes of arc.

This uncertainty has, of course, affected to an equal degree all chronometric measurements from the meridians in question, and longitudes have consequently been shifted backward and forward by hydrographers of different nations on their respective charts according as a greater or less weight was theoretically attached to various determinations of the initial point.

No such uncertainty can be said to attach to meridian measurements made by comparing previously regulated time-pieces by means of land or submarine telegraph lines.

A remarkable instance of this is shown by the transatlantic longitude measurements of the United States Coast Survey, where three measurements between the meridian of Greenwich and that of the New York City Hall, made in different years and through different cables, differ by only one-hundredth of a second of time.[1] An instance of the uncertainty attending longitudes measured in any other way is shown by the result of the operations for the determination of Brazilian longitudes, the Royal Observatory at Lisbon, one of the intermediate points, being found more than two miles in error when tested by the telegraphic method.[2]

The proposed publication of new charts of the China Sea, on a large scale, by the Hydrographic Office afforded an additional inducement to attempt the removal of the uncertainties attending the longitudes in this part of the world, and the completion of the measurement from Europe to the Atlantic ports of South America having

[1] U. S. Coast Survey Report, 1874, App. 18, page 181.

[2] Telegraphic Determination of Longitudes on the East Coast of South America, p. 83. Bureau of Navigation Washington, 1880.

liberated the instruments used for that purpose, a party of officers was organized by Commodore W. D. Whiting, U. S. N., Chief of the Bureau of Navigation, in the winter of 1880–'81, with the object of determining telegraphically from one or more established meridians the longitudes of the points in Eastern waters from which American, English, French, Spanish, and Dutch surveyors had made several thousand chronometric measurements.[1]

These established points were at Madras, in British India, and at Wladiwostok, on the Siberian coast.

The observatory at Madras has been for many years the point from which all the longitudes of British India have been reckoned, and in 1876 and 1877 officers of the Great Trigonometrical Survey of India measured with great care, through the telegraph cables, the meridian distances between Suez, Aden, Bombay, and Madras,[2] the longitude of Suez having been determined in a similar manner in 1874 by the astronomers of the English Transit of Venus Commission.[3]

The position of Wladiwostok was fixed in 1875 by the labors of Colonel Scharnhorst, of the Russian Engineer Corps, who measured telegraphically a chain of meridian distances overland from St. Petersburg to Wladiwostok.[4] Permission having been obtained from the several governments to land and set up instruments, the consent of the authorities of the Eastern Extension, China and Australasian Telegraph Company, and the Great Northern Telegraph Company for the use of their lines was readily and cordially granted.

The cables of the Great Northern Telegraph Company in Eastern waters extend from Wladiwostok to Nagasaki, Shanghai, Amoy, and Hong-Kong, while those of the Eastern Extension Company join Hong-Kong, Manila, Cape St. James, Singapore, and Madras, a branch extending from Singapore to Batavia and Port Darwin on the northern coast of Australia.

In consequence of the officially expressed intention of the English Government to connect the longitudes of Australia and Singapore with that of Madras in the spring of 1881,[5] it was confidently expected that on reaching Singapore it would not be necessary for the United States officers to proceed farther, but for some reason or other the Australian measurements have not yet been made.

The necessary instruments and observatories (the same used in the West Indian and South American work) were dispatched in January, 1881, under charge of Master S. C. Lemly, U. S. N., from New York to Yokohama by way of London and the Suez Canal, to avoid the frequent transshipment inseparable from the trans-Pacific route, and arrived safely in Japan on the 14th of April.

The U. S. S Palos, a small gunboat attached to the Asiatic squadron, was selected to transport the officers and instruments from port to port, and on March 1, 1881, Lieutenant-Commanders F. M. Green and C. H. Davis and Lieut. J. A. Norris were

[1] This work had been urged upon the Navy Department by the American Academy of Sciences by resolution at their meeting in Washington in April, 1880.

[2] General Report of the operations of the G. T. Survey of India during 1876, 1877. Calcutta, 1878.

[3] Account of Observations of the Transit of Venus, 1874, by Sir G. B. Airy, K. C. B. London, 1881.

[4] A detailed report of this measurement is in the library of the U. S. Naval Observatory.

[5] Letter from Lord Granville to Hon. J. Russell Lowell, September 10, 1880.

ordered to proceed to Yokohama, the following orders being issued to Lieutenant-Commander Green, the senior officer of the party:

NAVY DEPARTMENT,
Washington, March 1, 1881.

SIR: On the 21st instant you will regard yourself detached from the Hydrographic Office and will proceed to San Francisco and take passage on the Pacific Mail Steamship City of Pekin, which leaves on the 2d April next for Yokohama, Japan, and on your arrival report to Rear-Admiral J. M. B. Clitz for command of the U. S. S. Palos as the relief of Lieutenant-Commander J. G. Green.

The Navy paymaster at San Francisco will be directed to furnish you with transportation to Yokohama.

As soon as practicable after assuming command of the Palos you will take charge of the astronomical instruments, &c., shipped to Yokohama in charge of Master S. C. Lemly, U. S. N., and will proceed to measure, by means of the submarine telegraph cables, differences of longitude between the ports of Wladiwostok, Nagasaki, Yokohama, Shanghai, Amoy, Hong-Kong, Manila, Saigon, Singapore, and Madras.

While in Yokohama you will endeavor to connect your station with the meridian of Japan.

In order to enable you to perform this work you are authorized to direct officers and observatory attendants to travel by mail steamer, to pay the necessary expenses of such officers and men while detached from the ship, to direct the paymaster to make necessary advances of pay to officers separated from the ship; and when advisable to proceed to any station without the ship, you are authorized to turn over the command temporarily to the officer next in rank.

In proceeding up and down the China Sea, you will endeavor to so time your passages as to have a favorable monsoon, and so as to avoid unhealthy places during the sickly season. As you will probably be at Singapore on the completion of your telegraphic work, you are authorized to direct Lieutenant-Commander Davis, when his services can be dispensed with, to proceed home from there, bringing with him the sidereal chronometers; and you are also authorized to ship the astronomical instruments, &c., to the United States, when they are no longer needed.

As will be seen from the copies of letters furnished you, permission has been obtained from the companies owning the telegraph lines to use them for the exchange of time-signals; and from the various Governments to set up instruments and make astronomical observations at the respective points.

Upon the execution of these orders, and such others as the Chief of the Bureau of Navigation will give you for determining positions and examining shoals and reefs, or as much of them as may be practicable, you will return to Yokohama, reporting to Rear-Admiral J. M. B. Clitz, and from there return to the United States via San Francisco, accompanied by Lieutenant Norris and Master S. C. Lemly, bringing with you the records of your observations, and report at this Department in person.

Very respectfully,

N. GOFF, JR.,
Secretary of the Navy.

Lieutenant-Commander FRANCIS M. GREEN, U. S. N.,
Hydrographic Office, Navy Department.

Lieutenant-Commander Davis and Lieutenant Norris, having also been ordered to duty on the Palos, sailed accordingly with Lieutenant-Commander Green on the 2d of April, arriving at Yokohama and joining the Palos on the 24th.

As soon as practicable arrangements were made with the proper officers of the Japanese Government for the use of the lines between Yokohama and Nagasaki, and earnest efforts were made to have some point authoritatively designated as fixing the prime meridian of Japan. For some unexplained reason this question seemed difficult

to determine, and no decided answer was received to the repeated applications regarding the subject.

It was therefore decided to establish a permanent monument on the grounds of the United States Naval Hospital at Yokohama (see page 12), so that when decided upon the prime meridian of Japan could be conveniently and precisely connected with the chain of measurements. On the 30th of April Lieutenant Norris and Ensign C. Laird sailed for Nagasaki with one set of instruments, to take passage there for Wladiwostok; and, on arrival, finding no immediate opportunity of departure, established an observatory in the grounds of the Great Northern Telegraph Company and immediately adjoining the Japanese Government telegraph office.

Lieutenant-Commander Davis meanwhile had set up his observatory and instruments at Yokohama, but vexatious delays, caused by dilatory Japanese officials, prevented any work from being done till May 27, when the first successful exchange of signals took place between Nagasaki and Yokohama.

On May 18 the Palos sailed from Yokohama for Nagasaki, arriving on May 24, and on June 2 Messrs. Norris and Laird sailed for Wladiwostok; where, on arrival, they established their observatory exactly in the meridian of the one used by Colonel Scharnhorst. On May 27 and 28 and June 1 and 17 measurements were effected between Lieutenant-Commander Green at Nagasaki and Lieutenant-Commander Davis at Yokohama, but both at Wladiwostok and Nagasaki the rainy season had set in, and discouraging delays took place in consequence. This had been somewhat expected before leaving the United States, but the necessity of making the most difficult measurement—that between Singapore and Madras—during the winter months, prevented the commencement of the task at a more favorable season. By taking advantage of every possible opportunity for observing stars, the Yokohama-Nagasaki measurement was completed, and Lieutenant-Commander Davis, with his party, joined the ship at Nagasaki on June 27. Leaving Mr. Davis to occupy the Nagasaki station, the Palos sailed for Shanghai July 4, arriving on the 6th, and an observatory was speedily established on the bund or fore-shore opposite the premises of Messrs. D. A. Sassoon & Co., who courteously gave permission for occupying the ground.

During the month of July the measurements between Shanghai, Nagasaki, and Wladiwostok were completed, and both parties rejoined the Palos at Shanghai on August 11.

On August 15 the Palos sailed from Shanghai for Hong-Kong, leaving Lieutenant-Commander Davis and Mr. Lemly at Shanghai.

The weather was very threatening and stormy, a severe typhoon being experienced *en route;* but, a secure anchorage behind Namoa Island being reached in time, no damage ensued. Stopping at Amoy, Lieutenant Norris was established, with an observatory on Ku-lang-seu Island, and on the 24th of August the Palos arrived at Hong-Kong.

Although every possible facility was afforded by the authorities at Hong-Kong, the measurement from that port to Amoy and Shanghai proved a very tedious and difficult one.

The destructive typhoons which frequently occur at this season, do so much

damage that it was thought prudent to dismount the instruments and store them in a safe place on the approach of these storms. This occurred at each station, and the results justified the precaution. Continued rains for many days prevented any observations, and breaks in the cables rendered the exchange of signals impossible when the stars could be seen. By taking advantage of every chance for work, however, the requisite number of measurements were effected, and by the 1st of October all the members of the expedition had rejoined the ship at Hong-Kong, having completed the first stage of the work, from Wladiwostok and Yokohama to Hong-Kong.

The next step was to effect the measurement from Hong-Kong to Manila. A slight complication presented itself here, owing to the fact that the cable, instead of extending to Manila, was landed at Bolinao, on the island of Luzon, about 100 miles north of Manila, telegraphic communication between the two points being effected by the land lines of the Spanish Government. Lieutenant Norris was therefore directed to proceed to Bolinao and establish a transmitting station, and, in company with Lieutenant-Commander Davis and Master Lemly, sailed from Hong-Kong for Manila in the mail steamer of October 12, their departure being delayed by a heavy typhoon, which did much damage in the vicinity of Hong-Kong.

Intercourse between Bolinao and Manila is neither easy nor frequent, and some unavoidable delays took place in arranging the transmission of signals over the Spanish lines, but on October 30 and November 1 and 2 satisfactory exchanges of signals and time observations were effected. (For an account of the method of comparing the Hong-Kong and Manila times, see page ——.) By the first succeeding steamer Lieutenant-Commander Davis and Mr. Lemly returned to Hong-Kong, arriving there on November 18, Lieutenant Norris's return being delayed till the 25th by the difficulty of obtaining transportation.

In considering the best methods of performing the remaining measurements between Hong-Kong, Saigon, Singapore, and Madras, it seemed best for several reasons to keep the Palos at Hong-Kong and perform the journeys by mail steamer. In accordance with this decision, Lieutenant-Commander Green and Master R. H. McLean left Hong-Kong by steamer on the 21st of November for Singapore, Lieutenant-Commander Davis and Mr. Lemly proceeding by the same steamer to Saigon, and Lieutenant Norris being directed to occupy the Hong-Kong station on his arrival at that port.

The cable from Hong-Kong to Singapore has an intermediate station at Cape St. James, with a land line belonging to the French Government connecting Saigon with the cable station. As the relative positions of Saigon and Cape St. James have been exactly established by the French Government surveyors, it was only necessary to include a point at Cape St. James in the system of measurements to have all the French positions in Cochin China correctly determined.

In the same cordial and friendly manner which characterized the reception of the officers at every telegraph station, the officials of the Eastern Extension Company at Cape St. James afforded Lieutenant-Commander Davis and his party every possible assistance. Although the station at Cape St. James was a more healthy place than Saigon, it had some drawbacks. For the first time in the experience of the observers

astronomical work was in danger of interruption from the incursions of wild beasts. Large tigers were constantly prowling in the vicinity of the station, which was on the edge of the jungle, and more than once their tracks were found all about the observatory, so that loaded rifles were kept constantly in readiness while work was going on. That the danger was not imaginary was proved by the killing of a large tiger on the verandah of the telegraph station.

At Singapore the courteous assistance of both Government and telegraph officials prevented any serious difficulty, and by December 13 a sufficient number of measurements to Cape St. James had been made. The work between the latter point and Hong-Kong met with tedious delays from protracted rains and thick weather, but on the 10th, 11th, 12th, and 18th of December satisfactory exchanges took place, and on January 1, 1882, Lieutenant Norris arrived at Singapore to occupy that station, Lieutenant-Commander Davis and Mr. Lemly proceeding, with their instruments, from Saigon to Madras, and Lieutenant-Commander Green returning to Hong-Kong to resume command of the Palos.

The Navy Department had directed that, if upon examination it should be considered advisable, the observatory at Batavia should be included in the chain of longitudes; but it was found that the accuracy of the measurement made in 1871 by Dr. Oudemans between Singapore and the observatory at Batavia left nothing to be desired.[1]

The station selected by Lieutenant-Commander Davis at Madras was in the grounds of the observatory, four miles from the telegraph office; and, as messages between Madras and Singapore are all repeated at Penang, it seemed doubtful at first whether direct signals between the longitude stations at Madras and Singapore could be exchanged without a transmitting station at Penang. The skill and perseverance of the electricians, however, finally overcame all obstacles, and as soon as it was proved that the exchange could be successfully effected, Lieutenant-Commander Green returned to Hong-Kong.

The prime meridian of India passes through the observatory at Madras, and the final connection of our long chain of longitudes with it was much facilitated by the very great kindness of the Government astronomer, Norman R. Pogson, esq., C. I. E., who placed all the appliances of the observatory at the disposal of the officers, and removed every obstacle with untiring patience and energy.

A slight delay was experienced, from the difficulty of connecting the Government land line from the observatory with the cable wires and from the piercing the cable about 80 miles west of Penang by boring worms; but the break was soon repaired, and on January 20, 21, 23, 26, and 27 excellent measurements were made between Madras and Singapore, by Messrs. Davis and Norris, thus completing the long chain of 6,450 miles between Madras and Wladiwostok. In addition to the nine measurements constituting this chain, the latitudes of the Yokohama, Nagasaki, Shanghai, Amoy, Hong-Kong, Manila, Cape St. James, and Singapore stations were carefully determined by zenith telescope observations of from twelve to thirty pairs of stars at each place.

On the termination of the work Lieutenant Norris, by direction of the Secretary

[1] Bepaling van het Lengteverschil van Batavia en Singapore, door middel van seinen met den Onderzeeschen Telegraaf Kabel, door Dr. J. A. C. Oudemans, Batavia. 1874.

of the Navy, proceeded home by way of the Suez Canal, with the instruments of all the parties, and on February 27 Lieutenant-Commander Davis and Master Lemly rejoined the Palos at Hong-Kong.

By direction of Rear-Admiral Clitz the Palos proceeded to rejoin the squadron at Kobe, where, after the ship had been inspected by the admiral, Lieutenant-Commanders Green and Davis and Mr. Lemly were detached; and, being directed to proceed home by way of San Francisco, reached the Navy Department at Washington on April 29.

Of the fifty secondary meridians adopted by the English Hydrographic Office,[1] and accepted in large measure by the hydrographers of other nations, twenty-nine have now been corrected or verified by the telegraphic method, and of these corrections nineteen are due to the labors of American astronomers. Of the remainder those in Australia are about to be corrected by an English expedition, and those on the west coast of South America by officers of the United States Navy.

Previous correspondence between the Department of State and our foreign ministers had prepared the way for the officers of the expedition, so that the authorities at the various ports were ready to extend every facility for the performance of our work.

Especial acknowledgments are due to H. E. Sir Frederic A. Weld, K. C. M. G., governor of the Straits Settlements, Hon. Cecil C. Smith, colonial secretary, and Capt. H. Ellis, master attendant, at Singapore; to Norman R. Pogson, esq., C. I. E., Government astronomer, at Madras; to Monsieur Myre de Villars, governor of French Cochin-China, and C. F. Tremlett, esq., H. B. M. consul, at Saigon; to Lieutenant-General Primo de Riviera, captain-general of the Philippine Islands, Admiral Polo de Bernabe, Col. N. Pastor Diaz, and Ogden E. Edwards, esq., at Manila; and to Admiral Feldhausen, governor of Wladiwostok, for repeated acts of kindness and courtesy.

Our experience in other parts of the world had prepared us for a cordial reception and efficient assistance at the hands of the gentlemen in charge of the various telegraph cables, and our anticipations were not in the least disappointed. Not only was every assistance given in the execution of the work, but at stations away from the cities, where the officers would otherwise have been obliged to live very roughly, the kindest hospitality was extended to them The names of all to whom acknowledgments are due would include a complete list of the officials of the cable companies at each station, but to Messrs Helland, Suenson, Petersen, Müller, Henningsen, and Russell, of the Great Northern Telegraph Company, and to Messrs. Pell, Squier, Bullard, Hawes, and Hare, of the Eastern Extension Company, the officers of the expedition are especially indebted. The fact cannot be too strongly expressed that without the zealous and persevering co-operation of the telegraph officials no such undertaking as this can be successful, and no one without absolute experience can realize the discouraging delays and difficulties which would be almost insurmountable without the cordial assistance of the members of the cable staff.

It may not be out of place to state that the completion of this report terminates the association on duty of the three officers who have been principally engaged in the work and who have successfully carried on similar undertakings together since 1877, two of them since 1874, without the slightest misunderstanding or breach of perfect harmony.

[1] Admiralty Instructions to Hydrographic Surveyors, page 36. London, J. D. Potter, 1877.

DESCRIPTION OF STATIONS.

YOKOHAMA.

The observatory at Yokohama was placed in the grounds of the United States Naval Hospital, No. 99, Bluff. The pier was built of blocks of stone, so as to constitute a permanent mark for future reference. The center of the pier is 9 feet 7 inches east of the hospital flagstaff, and 1,074.4 feet south 9° 22′ 16″ west from the flagstaff of the English naval storehouse. This flagstaff is understood to be coincident in position with the old observation spot in what was formerly described by the English surveyors as Hospital Square, and so referred to in the Admiralty list of secondary meridians. The observatory was connected with the Japanese telegraph office by a wire along the bund, and the Government system of land lines between Yokohama and Nagasaki was used in the exchange of time signals.

NAGASAKI.

The pier at Nagasaki was placed in the compound of the Great Northern Telegraph Company's offices, in the rear of the large building. These offices have been moved to a considerable distance from the place occupied by them during the Transit of Venus observations in 1874.

From the transit pier the angle of the sea-wall at the northern corner of the custom-house bore N. 69° 58′ W. (true), distant 504 feet; the observation spot on Minage Point, S. 77° 54′ W. (true), distant 4,951 feet; and the Transit of Venus Longitude Station (occupied by Prof. G. Davidson in 1874), S. 30° 22′ W., distant 1,910 feet.

The observatory was connected by earth and line wires with the telegraph office, less than 100 feet distant, where connection was made, as occasion required, with the lines leading to Yokahama, Shanghai, or Wladiwostok.

SHANGHAI.

The most advantageous situation available for the observatory at Shanghai was on the grass plat between the river and the Bund or Yangtze road. Although all this land is made ground it was found to have very little tremor.

By the courtesy of Messrs. D A. Sassoon & Co. permission was obtained to establish the observatory on the fore-shore opposite their premises This point was conveniently near the office of the Great Northern Telegraph Company in the Nankin road, so that wires were easily extended from the observatory to the telegraph office.

The transit pier was 203 feet east and 88 feet north of the angle of the building on the northwest corner of the Nankin and Yangtze roads, 582.5 feet due south (true) of the monument erected in memory of the officers of the "Ever Victorious" army, and 1,344 feet S. 28° 28′ E. (true) from the flagstaff of the English consulate.

WLADIWOSTOK.

At Wladiwostok the observatory was placed in the meridian and 75 feet south of the pier used by Colonel Scharnhorst in 1875, the position of which is marked A on a chart of Wladiwostok furnished by the Russian Government and on file at the Hydrographic Office. The position occupied by Lieutenant Norris was about 200 yards to the southward of the buildings of the Great Northern Telegraph Company. The position of point A, as determined by Colonel Scharnhorst, was

Latitude, N. 43° 6′ 51″.0;
Longitude, E. 131° 52′ 48″.8.

AMOY.

The observatory was placed in the inclosure of the Great Northern Telegraph Company, at the southeastern extremity of the island of Ku-lang-seu. From the transit-pier the signal-staff on Ku-lang-seu bore N. 48° 14′ E. (true), distant 1,793 feet. The flagstaff of the Great Northern Telegraph Company bore S. 43° 16′ W. (true), distant 208 feet.

HONG-KONG.

The observatory was situated in the yard of the Artillery Barracks, and its exact location was plotted on the official plans of Hong-Kong by the surveyor-general. From the transit-pier the Cathedral tower bore S. 61° 23′ 20″ W., distant 1,200 8 feet;[1] the north angle of Wellington Battery (nearly in the meridian of the old observation spot) S. 69° 6′ 15″ E., distant 1,528.3 feet; and the northeast angle of the Hong-Kong Club House, N. 80° 9′ W., distant 2,031 feet.

MANILA.

The observatory at Manila was erected on the rampart of a battery known as Baluarte del Plano, forming part of the fortifications of the city of Manila and situated in rear of the college and convent of the Jesuits, between that building and the sea. The site chosen for the pier was a stone gun-platform, the fourth counting from the north; and from the pier the cross on the dome of the cathedral was just visible, clear of the northernmost building of the Jesuit College. From the center of the pier, the center of the dome of the cathedral bore N. 23° 45′ 19″ E., distant 760.73 feet The center of the light-house at the entrance to the Pasig River bore N. 62° 43′ W., distant 4,934.15 feet.

[1] These bearings and distances were kindly furnished by Lieutenant-Commander Alfred Carpenter, R. N., commanding H. M. Surveying Ship Magpie.

BOLINAO.

As this station was only occupied for transmission of signals, no exact description is necessary.

CAPE ST. JAMES.

The observatory at Cape St. James was placed on the beach near the dwelling occupied by the staff of the Eastern Extension Telegraph Company, and about fifty yards from the telegraph office. The soil was loose and sandy, but a sufficiently firm foundation was obtained for the pier by packing sand and stones and ramming the loose earth, and the spirit-level showed only slight instability in the pier during the whole progress of the observations. The pier was made of the same three stones used in Manila, its center being 29.5 feet north and 4 5 feet west of the northeast corner of the garden wall of the dwelling before mentioned. The light-house on Cape St. James was invisible from the observatory, but its bearing and distance were determined by triangulation as follows: Light-house from center of pier S. 35° 31′ E., distant 5,767 feet.

SINGAPORE.

An excellent site was found for the observatory at Singapore, in the rear of the master attendant's office and close to the sea-wall of what was formerly Fullerton Battery, now dismantled and destroyed. By the kindness of Lieutenant Petley, R. N., the old observation spot in Fullerton Battery, from which so many chronometric measurements have been made, was identified.

From the transit-pier the center of the Cathedral tower bore N. 11° 36′ W. (true), distant 2,027 feet; the flagstaff of Fort Canning N. 47° 33′ W. (true), distant 3,085 feet; and the old observation spot in Fullerton Battery S. 5° 37′ W. (true), distant 169 feet.

MADRAS.

The station at Madras was in the compound of the Government Observatory, and the transit-pier was placed with its center exactly in the Prime Meridian of India.

Connection with the telegraph office, which was about four miles distant, was effected by means of the permanent wire used for time and meteorological signals from the observatory.

The same three stones used at Manila and Cape St. James were firmly planted here, and were left to mark the place, which was 109 feet north of the meridian circle of the observatory and 41 feet north of the pier used by Major Campbell, R. E., in the measurements Madras-Bangalore-Mangalore-Bombay-Aden-Suez, in 1876 and 1877.

DESCRIPTION OF INSTRUMENTS.

For the determination of time and latitude a combination of the transit instrument and zenith telescope was designed in 1873 by Mr. J. A. Rogers with especial reference to work of this kind; and, under his supervision, two of these instruments,

precisely alike, were constructed by Mr. Edward Kahler. They are of 30 inches focal length, with object glasses of 2½ inches clear aperture, and are so constructed that the eye-piece is at one end of the horizontal axis, a prism at the junction of the telescope-tube and axis reflecting at a right angle the rays from the object-glass, thereby enabling the observer to direct the instrument to stars of any zenith distance without changing his position The transverse arms which support the ends of the telescope axis are firmly screwed to the top of a vertical and slightly conical axis which revolves in the cylinder surmounting the tripod. A small universal level over the head of this axis is useful in leveling the instrument approximately. The horizontal circle is 14 inches in diameter, has two verniers, and reads to 10 seconds. It is furnished with a clamp and double-headed tangent screw for slow azimuthal motion, and with two sliding stops which, when fastened at the proper points on the circle by clamp screws, enable the telescope to be turned exactly 180° in azimuth for zenith telescope observations for latitude. A powerful clamp at the lower end of the vertical axis fixes it firmly in its seat when the instrument is adjusted.

By means of the horizontal circle the telescope can be readily turned 90° from the meridian to the prime vertical; a feature of great value when, from absence of a suitable star-list or from any other cause, the zenith telescope method of determining latitude is not practicable.

The horizontal axis has a finding circle 8 inches in diameter, reading to minutes, and on the opposite end of the axis is a transverse level for indicating any change in the inclination of the telescope. This level, with a filar micrometer of the usual form attached to the eye-piece, forms the zenith telescope attachment for the determination of latitude.

The eye-pieces are of the Ramsden pattern, magnifying about 50 and 80 diameters respectively.

The bearings of the Ys which support the axis are segmental in shape, and have no micrometric attachment for either level or azimuth adjustment.

The lines of the reticle were ruled on glass and were illuminated by a lamp at the opposite end of the axis. The striding levels were of the usual form, having divisions on the glass tube about one millimeter apart, equal to 0″.94 of arc or 0ˢ.063 of time.

One of these instruments was used by Lieutenant-Commander Green and one by Lieutenant-Commander Davis. The transit used by Lieutenant Norris was borrowed from the Transit of Venus Commission, and was somewhat similar in general plan, although much heavier Still another one of the Transit of Venus instruments was carried, in case of accident, but was not used.

The time-pieces used by the expedition consisted of four sidereal break-circuit chronometers, made by Messrs. T. S. & J. D. Negus, of New York. These excellent instruments, Nos. 1178, 1254, 1295, and 1519, have done all the longitude work of the West Indies and South American Expeditions as well as this one, having been in constant use since 1874, with but slight intermissions for cleaning and examination, and have done their work in a manner worthy of all praise. Their rates, although of course varying somewhat in consequence of great changes of temperature, have been small and steady.

The chronographs were of the cylinder pattern, two made by Messrs. W. Bond & Son, of Boston, and one, belonging to the Transit of Venus Commission, made by Messrs. A. Clark & Son. They gave entire satisfaction.

For working over land lines two polarized ink-writers, made by Messrs. Siemens, were used For cable work the apparatus was very simple, consisting of a Thomson speaking galvanometer, a lamp, and a double cable key. Over a portion of the Great Northern Telegraph Company's cables it was found expedient to use a recording instrument, which, it is believed, is peculiar to that company, called an "undulator," and somewhat similar in principle to the Thomson siphon recorder.

A twelve-cell gravity battery was furnished each party.

Portable wooden observatories were designed by Mr. J A. Rogers for sheltering the instruments and observers. They were ingeniously and strongly made, so as to be easily and quickly set up and taken down, and after being set up at forty-four stations in the East and West Indies and South America are still in good order.

Brick piers were generally erected for the transit instruments, but, on the whole, piers were preferred made of three cylinders of stone, each 22 inches in diameter and 12 inches in height.

In addition to the above instruments each party was furnished with a sextant and artificial horizon, a theodolite, a surveyor's chain, a supply box containing carpenters' tools, wire, battery material, plaster of Paris, lanterns, oil, &c.

The values of the divisions of the various levels were carefully determined and verified. Repeated observations gave the following values:

Hydrographic Office, transit No.	1,	1 division = 0″.94	or $0^s.063$
Hydrographic Office, transit No.	2,	1 division = 0″.94	or $0^s.063$
Transit of Venus, transit No.	1505,	1 division = 1″.112	or $0^s.074$

For the zenith telescope levels:

Hydrographic Office, transit No.	1,	1 division = 1″.000	
Hydrographic Office, transit No.	2,	1 division = 1″.006	
Transit of Venus, transit No.	1505,	1 division = 1″.067	

The pivots of the Hydrographic Office transits were perfectly cylindrical and equal in size, as indicated by repeated measurements with a spherometer kindly loaned for the purpose by Prof. W. Harkness, U. S. N.[1] For the Transit of Venus instrument, No. 1505, a correction of $\left\{\begin{matrix}-\\+\end{matrix}\right\}$ $0^s.152$, circle $\left\{\begin{matrix}\text{west}\\\text{east}\end{matrix}\right\}$ must be applied for inequality of pivots, no irregularity in their size being appreciable.

The equatorial intervals of the transit lines were arranged in groups, as follows: One, three, seven, three, one The middle group of seven were the only ones used

[1] For an account of Professor Harkness' application of the spherometer to the measurement of pivots, see vol. 38, p. 487, of the Monthly Notices of the Royal Astronomical Society.

for time observations, and their intervals were carefully determined from repeated observations of circumpolar stars. The adopted values for circle east were as follows:

	No. 1.	No. 2.	No. 1505.
	s.		s.
I	+ 11.85	+ 12.08	+ 11.97
II	+ 7.91	+ 8.02	+ 7.98
III	+ 3.95	+ 4.00	+ 3.98
IV	0.00	— 0.01	0.00
V	— 3.97	— 4.02	— 3.99
VI	— 7.92	— 8.02	— 7.98
VII	— 11.87	— 12.06	— 11.96

In these instruments, as in all others of similar pattern, a correction for the effects of flexure of the axis must be introduced. To determine its exact amount for transits Nos. 1 and 2 careful observations were made in the following manner: a large number of stars were observed on the meridian at various distances north and south of the zenith, in both positions of the instrument, and from each star a clock correction was deduced, corrected for the level collimation and azimuth errors of the instrument. The difference between each clock correction thus obtained and the true correction obtained by comparing the chronometer with the standard clock of the Naval Observatory was assumed, after reducing to the equator by dividing by the secant of the star's declination, to be due to the flexure at the zenith distance of that star expressed in seconds of time.

On obtaining the ratio of the flexure corrections at the various zenith distances by dividing each one by the value at the zenith they were found to follow almost exactly the value of the cosine of the zenith distance, having a maximum value when the telescope was pointed to the zenith, and a zero value when it was horizontal.

The Transit of Venus instruments, having shorter and thicker axes, showed a less flexure. Its value was determined by Professor Harkness by observations with a pair of collimators, one horizntal and the other vertical.

From these observations the corrections for flexure were found to be—

Hydrographic Office, transit No. 1, zenith value, $f = 0^s.55$
Hydrographic Office, transit No. 2, zenith value, $f = 0^s.54$
Transit of Venus, transit No. 1505, zenith value, $f = 0^s.275$

And the flexure correction is for any star, circle $\left\{\begin{matrix}\text{east} + \\ \text{west} -\end{matrix}\right\} f \cos z \sec \delta$.

The values of a revolution of the micrometer screws were determined by numerous observations of circumpolar stars at elongation.

From all these observations the following values have been deduced:

Hydrographic Office, No. 1, 1 revolution = 65″.80
Hydrographic Office, No. 2, 1 revolution = 66″.83
Transit of Venus, No. 1505, 1 revolution = 68″.70

PERSONAL EQUATION.

For several reasons it has not been deemed expedient to introduce a correction for personal equation into the computations. To introduce arbitrarily into each link of the measurement a correction deduced from observations made either previously or subsequently to the measurement would not be at all satisfactory, as, under the various conditions inevitably experienced in a chain of positions nearly seven thousand miles in length, such a correction must at times vary considerably from the truth. The best way to eliminate this source of error would be to exchange stations after each measurement, but considerations of time and expense make this course impracticable.

By means of the repeated use of the personal equation machine of Professor Eastman, at the Naval Observatory, it was found that the habitual errors of the observers engaged in this measurement had all the same sign; that is, they habitually observed the transit of a star a few hundredths of a second after its occurrence, but their respective differences were so small that it seemed evident that to introduce results so minute as corrections would not increase the trustworthiness of the result.

In order to avoid as far as practicable the error arising from differences of personal habit in observing, it was sought to place each observer, in making the long chain of measurements, alternately east and west of the other.

While in so extensive a work it cannot be expected that all sources of error and uncertainty have been avoided, it is felt that the close coincidence of the longitude of Wladiwostok resulting from this measurement with the one determined by Colonel Scharnhorst from the measurement across Siberia, sufficiently demonstrate its general accuracy as well as the excellence of the methods employed.

METHODS OF OBSERVATION.

As soon as practicable after arriving at a station a site was selected, and an approximate meridian line was laid out for use in setting up the observatory and pier. After building the pier two or three days were allowed for the cement to harden, and the transit instrument, chronograph, and telegraph instruments were set up and carefully adjusted. During the first ensuing clear evening the transit was placed in the meridian by repeated observations of zenith and circumpolar stars. The telegraph instruments, being connected at both stations with the local line leading to the cable at the telegraph office or at its landing hut so that telegraphic communication could be readily established at the observatories, the routine was as follows:

About 5 or 6 p. m. messages were exchanged as to clearness of weather and an understanding was arrived at as to the probable time that the business of the office would permit the exchange of signals. About two hours before this time the night's work was begun by observing the transits of six or eight time stars and two or three circumpolars. As soon as the business of the line would admit, the observatories were placed in telegraphic communication with each other by connecting the wires with the cable line, one of the telegraph clerks at each place coming to the observatory to assist in sending messages; and, communication being established, the chronometers were compared in the following manner: At ten seconds before the completion of a minute by his chronometer the senior observer sent a rattle or preparatory signal by

tapping his key several times in quick succession; then, exactly at the even minute, pressed his key again for about a quarter of a second and repeated this signal at intervals of five seconds until the completion of the minute. The hour and minute when the first signal was sent was then telegraphed, and repeated to insure correctness.

The time of arrival of these signals, marked by the deflection of the ray of light from the galvanometer, was recorded on the chronograph at the receiving station, and five similar sets were exchanged each way, making sixty-five comparisons sent and received by each observer.

After these exchanges of signals the transits of five or six more time stars and two or three circumpolars were observed, completing the night's work. The position of the axis of the transit instrument was reversed every night, to facilitate the determination of the collimation error, and the level was applied and recorded frequently.

In exchanging time signals the positive current was always used, to guard against any possible difference of velocity as compared with negative currents. This course had the additional advantage that only one sending key was used and the deflection of the ray of light at the receiving station took place always in the same direction.

Between Hong-Kong and Manila the comparison made through the transmitting station at Bolinao, though equally accurate, was made in a slightly different manner. As the cable from Hong-Kong to Bolinao and the land line from Bolinao to Manila could not be connected, an automatic comparison was first made between the chronometers at Manila and Bolinao, then the comparison was made as usual between Hong-Kong and Bolinao, and finally another automatic comparison was made between Bolinao and Manila.

This automatic comparison was also used between Nagasaki and Yokohama, and was effected by causing the break-circuit signals of the chronometer to be transmitted over the main line and to be recorded on the chronograph at the receiving station. Each chronometer was thus made to beat over the main line for about five minutes, making about three hundred comparisons each way.

Before commencing the observations at each station observing lists for time and circumpolar stars were prepared, showing the stars' magnitude, zenith distance on the meridian, and approximate chronometer time of culmination.

In preparing to observe for latitude pairs of stars were selected, generally not more than 20° from the zenith and not differing in zenith distance more than twenty minutes of arc. It was found desirable that the stars of a pair should be not less than one and not more than fifteen minutes of right ascension apart. An observing list was prepared, showing the available pairs of stars in order of right ascension, the zenith distance of each north or south, and the approximate chronometer time of culmination.

The telescope being in the meridian, one of the movable stops on the horizontal circle was moved up against one side of the tangent clamp, and there fixed by its clamp-screw. The tangent clamp was then loosened, and the instrument was turned 180° on its vertical axis. This was generally done by turning off approximately 180° by the horizontal circle, and then adjusting the telescope in azimuth by a circumpolar star on the middle transit thread at culmination. When the telescope was adjusted in its new position, the other stop was fixed against the other side of the tangent clamp.

It could then be turned exactly 180° in azimuth, bringing up against the stop when in the meridian line.

Being set at the mean zenith distance of the first pair of stars, the bubble of the transverse level was brought to the middle of its tube; and, as soon as the first star of the pair arrived on the middle transit thread, it was bisected by the middle micrometer thread and the time by chronometer noted by the assistant, who also recorded the level and micrometer reading. The telescope was then turned 180° in azimuth, the tangent clamp bringing up against its stop. On the appearance of the second star it was bisected on the middle transit thread by the same micrometer wire, and the time, micrometer, and level again recorded. This proceeding was repeated for each pair of stars, from twelve to thirty pairs being generally observed.

REDUCTION OF TIME OBSERVATIONS.

The preliminary reductions of the observations were made by the observers, the subsequent rigid reductions being made by Lieutenant Commander Davis, with the exception of a few nights reduced by Lieutenant Norris, who has also reduced all the latitude work.

An approximate reduction of each night's work was first made by applying to the mean recorded time of the transit of each star the corrections for missed threads, the error of axis, level, azimuth, collimation, diurnal aberration, and hourly rate.

The difference between the reduced meridian passage of each star and its right ascension gave a value for the clock correction at the epoch to which all observations of that night were reduced. In cases where this value differed considerably from the mean the star was examined and if still found anomalous was rejected [illegible]

N denoting the normal number (7) of threads, and n the number of threads observed. (See Chauvenet's Astronomy, Vol. II, p. 198)

The hourly rate was obtained by interpolation, or graphically, from the differences between the mean preliminary clock-corrections of the several nights at a station.

The middle time of the signals sent and received at both stations was the epoch of comparison.

The middle time of observation of clock stars was the epoch to which the reduction was usually made, and the clock correction was reduced to the epoch of comparison by applying the hourly rate.

The right ascensions of all stars observed were taken from the American Nautical Almanac, or from the Berlin list of 539 stars. The places in the American Nautical Almanac have been corrected by the constant $-0^s.024$ + the correction given by Professor Newcomb in Appendix III, Washington Observations, 1870.

In the column marked "Chronometer corrections" the quantities in brackets are the apparent corrections derived from circumpolar stars, and do not enter into the final determinations of the chronometer corrections.

To guard against clerical errors the chronograph sheets were always read twice and collated with the record.

DEDUCED LONGITUDE.

As the rate of the chronometers is so small that the difference between the times shown by their faces is practically the same throughout the time of exchanging signals, the middle time between the beginning and end of the exchange of time-signals is used as the time to which the chronometer corrections are reduced.

If we call this time T_0 and let ΔT_e and ΔT_w = the corrections to the eastern and western chronometers at T_0;

T' and T'' the differences between the chronometers by signals sent from east to west and west to east;

w = wave and armature time, or the time required for the electric impulse to pass through the conductor and to overcome the inertia of the receiving instrument;

λ' = the difference of longitude deduced from signals sent from east to west;

λ'' = the difference of longitude deduced from signals sent from west to east;

λ = the true difference of longitude;

Then—

$$\lambda' = (\Delta T_e - \Delta T_w) + T' + w$$
$$\lambda'' = (\Delta T_e - \Delta T_w) + T'' - w$$
$$\lambda = \tfrac{1}{2}(\lambda' + \lambda'')$$
$$w = \tfrac{1}{2}(\lambda' - \lambda'')$$

The details of the deduced longitudes for each night will be found on pages 56 and 57.

REDUCTION OF LATITUDE OBSERVATIONS.

As the resulting latitudes are directly affected by any error in the declinations of the stars observed, great care was necessary to use only those places which had been accurately determined, and only such stars were used as could be found in the American Nautical Almanac, Berlin Star List, Safford's List of Latitude Stars, Stone's Cape Catalogue, and the various Greenwich catalogues.

In reducing the latitude work the following notation was adopted:

Let—

φ = the latitude of the station.

δ_n and δ_s = the apparent declinations of the northern and southern stars.

z_n and z_s = the zenith distance of the northern and southern stars.

z_0 = the zenith distance corresponding to the zero reading of the micrometer.

m_n and m_s = the micrometer reading for northern and southern stars in seconds of arc.

M_n and M_s = the micrometer reading for northern and southern stars in micrometer revolutions.

l_n and l_s = the state of the level for northern and southern stars in seconds of arc.

L_n and L_s = the state of the level for northern and southern stars in level divisions.

r_n and r_s = the value of mean refraction at z_n and z_s.

In these observations either one of two cases may occur.

CASE I. When the circle is east for the northern star and west for the southern star, the micrometer reading increases as the zenith distance decreases.

CASE II. When the circle is east for the southern star and west for the northern star, the micrometer reading increases as the zenith distance increases.

Hence in CASE I—

$$z_n = z_0 - m_n + l_n + r_n$$
$$z_s = z_0 - m_s + l_s + r$$
$$z_n - z_s = (m_n - m_s) - (l_n - l_s) - (r_n - r_s)$$

And in CASE II—

$$z_n = z_0 + m_n - l_n + r_n$$
$$z_s = z_0 + m_s - l_s + r_s$$
$$z_n - z_s = -(m_n - m_s) + (l_n - l_s) - (r_n - r_s)$$

Now, since

$\varphi = \delta_s + z_s$ and also $\varphi = \delta_n - z_n$, then adding these two equations $\varphi = \frac{1}{2}(\delta_n + \delta_s) + \frac{1}{2}(z_n - z_s)$

Then, in CASE I—

$$\varphi = \tfrac{1}{2}(\delta_n + \delta_s) + \tfrac{1}{2}(m_n - m_s) - \tfrac{1}{2}(l_n - l_s) - \tfrac{1}{2}(r_n - r_s)$$

And in CASE II—

$$\varphi = \tfrac{1}{2}(\delta_n + \delta_s) - \tfrac{1}{2}(m_n - m_s) + \tfrac{1}{2}(l_n - l_s) - \tfrac{1}{2}(r_n - r_s)$$

$\frac{1}{2}(m_n - m_s) = \frac{1}{2}(M_n - M_s) \times$ . . { 65″.80 for transit No. 1. / 66″.83 for transit No. 2. / 68″.70 for transit No. 1505.

$\frac{1}{2}(l_n - l_s) = \frac{1}{2}(L_n - L_s) \times$ . . . . { 1″.00 for transit Nos. 1 and 2. / 1″.07 for transit No. 1505.

$\frac{1}{2}\ r_n - r_s = \frac{1}{2}(m_n - m_s) \times$ . . . . { 0 .0167 for $z = 0°$. / 0 .0200 for $z = 20°$. / 0 .0225 for $z = 30°$.

These values for differential refraction were taken from Bessel's tables. The stars were all observed on the meridian, or so nearly so as to need no correction on that account.

Transits of stars observed at Nagasaki, Japan, by Lieut. John A. Norris, U. S. N., to determine the correction of sidereal chronometer Negus 1519.

Date.	Name of Star.	Circle.	No. of threads.	Transit over mean of threads.	Flexure.	Level.	Azimuth.	Aberration and collimation.	Rate.	Seconds of corr. transit.	R. A.	Chron. correction.	c.
1881.				*h.* *m.* *s.*	*s.*	*s.*	*s.*	*s.*	*s.*	*s.*	*h.* *m.* *s.*	*h.* *m.* *s.*	*s.*
May 28	α Bootis	W.	7	5 32 16.86	—0.28	—0.12	+0.30	—2.18	—0.04	14.54	14 10 17.17	8 38 2.03	0.00
	ρ Bootis	.	7	5 48 45.56	—0.32	—0.17	+0.05	—2.39	—0.03	42.70	14 26 45.28	2.58	0.04
	β Ursæ Minoris . .	.	6	6 13 17.61	—0.77	—0.47	—3.18	—7.74	—0.02	5.43	14 51 7.95	[2.51]	. .
	γ^2 Ursæ Minoris . .	.	7	6 43 7.33	—0.70	—0.44	—2.64	—6.73	—0.01	56.81	15 20 59.44	[2.03]	. .
	θ Coronæ Borealis .	.	7	6 50 11.52	—0.32	—0.20	+0.03	—2.41	0.00	8.62	15 28 11.05	2.43	0.11
	α Coronæ Borealis .	.	7	6 51 42.53	—0.31	—0.19	+0.14	—2.30	0.00	39.87	15 29 42.26	2.39	0.15
	α Serpentis	.	7	7 0 27.18	—0.25	—0.16	+0.56	—2.06	0.00	25.27	15 38 27.87	2.60	0.06
	β Serpentis	W.	6	7 2 44.76	—0.27	—0.17	+0.38	—2.13	0.00	42.57	15 40 45.08	8 38 2.51	0.03
	ϵ Serpentis	E.	5	7 6 51.65	+0.24	—0.48	+0.76	+2.02	0.00	54.10	15 44 56.57	8 38 2.38	0.10
	ζ Coronæ Borealis .	.	7	7 14 38.13	+0.31	—0.61	+0.18	+2.27	0.00	40.28	15 52 42.00	2.71	0.17
	η Draconis	.	7	7 44 20.73	+0.51	+0.23	—1.67	+4.26	+0.02	24.68	16 22 26.33	[2.25]	. .
	ζ Herculis	.	7	7 58 45.86	+0.32	+0.08	+0.03	+2.37	+0.02	48.68	16 30 51.28	2.60	0.00
	$\varkappa$ Ophiuchi	.	7	8 14 0.13	+0.26	—0.05	+0.65	+2.04	+0.03	3.06	16 52 5.60	2.54	0.00
	ζ Draconis	E.	7	8 30 23.86	+0.56	—0.10	—2.17	+4.93	+0.04	27.12	17 8 29.99	[2.87]	. .

$a' = +1.263$ (circle W.); $a'' = +1.628$ (circle E.); $c = 2.033$ (+ with circle E.).

Chronometer No. 1519, at $7^h\ 0^m$ chron. time, $8^h\ 38^m\ 2^s.54 \pm 0^s.023$ slow, losing $0^s.025$ per hour.

$4^h\ 50^m$ $8^h\ 38^m\ 2^s.40$

Transits of stars observed at Nagasaki, Japan, by Lieut. Commander F. M. Green, U. S. N., to determine the correction of sidereal chronometer Negus 1519.

Date.	Name of Star.	Circle.	No. of threads.	Transit over mean of threads.	Flexure.	Level.	Azimuth.	Aberration and collimation.	Rate.	Seconds of corr. transit.	R. A.	Chron. correction.	c.
1881.				*h.* *m.* *s.*	*s.*	*s.*	*s.*	*s.*	*s.*	*s.*	*h.* *m.* *s.*	*h.* *m.* *s.*	*s.*
June 1	4 Ursæ Minoris . .	W.	4	5 31 26.28	—1.87	+0.70	—1.48	—0.68	+0.01	22.06	14 0 24.16	[8 38 [1.20]	. .
	ρ Bootis	.	7	5 48 45.75	—0.64	+0.27	+0.02	—0.16	+0.01	45.25	14 26 45.26	0.01	0.00
	π Bootis	.	7	5 57 11.46	—0.55	+0.25	+0.12	—0.15	0.00	11.13	14 35 11.25	0.12	0.02
	ϵ Bootis	.	7	6 1 50.89	—0.63	+0.31	+0.04	—0.16	0.00	50.45	14 39 50.62	0.17	0.07
	β Ursæ Minoris . .	.	7	6 13 11.08	—1.54	+0.79	—1.08	—0.53	0.00	8.72	14 51 7.80	37 [50.08]	. .
	β Bootis	.	7	6 19 31.41	—0.72	+0.37	—0.08	—0.19	0.00	30.79	14 57 31.00	38 0.21	0.11
	χ Bootis	W.	7	6 21 24.44	—0.62	+0.31	+0.04	—0.16	0.00	24.01	14 59 24.00	+8 37 50.00	0.11
	δ Bootis	E.	7	6 32 43.99	+0.66	+0.53	—0.02	+0.22	0.00	45.38	15 10 45.54	[8 38 0.16	0.06
	1 H. Ursa Minoris .	.	7	6 35 19.32	+1.19	+0.95	—1.81	+0.48	0.00	20.13	15 13 20.08	37 [59.95]	. .
	γ^1 Ursæ Minoris . .	.	7	6 42 58.67	+1.38	+1.14	—2.55	+0.59	—0.01	59.22	15 20 59.35	38 [0.13]	. .
	β Coronæ Borealis .	.	7	6 44 57.03	+0.63	+0.53	+0.07	+0.21	—0.01	58.46	15 22 58.62	0.16	0.06
	θ Coronæ	.	6	6 50 9.51	+0.65	+0.55	+0.02	+0.21	—0.01	10.93	15 28 11.05	0.12	0.02
	α Coronæ Borealis .	.	7	6 51 40.66	+0.61	+0.56	+0.13	+0.20	—0.01	42.15	15 29 42.26	0.11	0.01
	γ Coronæ	E.	7	6 59 46.51	+0.61	+0.61	+0.15	+0.20	—0.01	48.07	15 37 48.02	+8 37 59.95	0.15

$a' = +0^s.43$ (circle W.); $a'' = +1^s.22$ (circle E.); $c = 0^s.16$ (+ with circle E.).

Chronometer No. 1519 at $6^h\ 16^m$ chron. time, $8^h\ 38^m\ 0^s.10 \pm 0^s.02$ slow, gaining $0^s.02$ per hour.

$4^h\ 50^m$ $8^h\ 38^m\ 0^s.13$

Transits of stars observed at Yokohama, Japan, by Lieut. Commander C. H. Davis, U. S. N., to determine the correction of sidereal chronometer Negus 1254.

Date.	Name of Star.	Circle.	No. of threads.	Transit over mean of threads.	Flexure.	Level.	Azimuth.	Aberration and collimation.	Rate.	Seconds of corr. transit.	R. A.	Chron. correction.	w.
1881.				*h.* *m.* *s.*	*s.*	*s.*	*s.*	*s.*	*s.*	*s.*	*h.* *m.* *s.*	*h.* *m.* *s.*	*s.*
May 28	21 Cassiop. S. P.	E.	4	3 22 4.24	−0.68	−0.10	−1.90	+2.12	+0.06	3.74	0 37 40.31	+0 15 [45.57]	. .
	31 Comæ	.	7	3 30 10.71	+0.61	+0.08	−0.08	−0.69	+0.06	10.69	12 45 57.03	40.34	0.20
	δ Virginis	.	7	3 33 53.45	+0.46	+0.06	−0.28	−0.61	+0.06	53.14	12 49 30.48	40.34	0.20
	α^2 Can. Venat	.	7	3 34 43.86	+0.69	+0.08	+0.04	−0.78	+0.05	43.94	12 50 30.52	40.58	0.04
	43 Cephei, H. S. P.	.	5	3 36 57.53	−3.65	−0.42	−6.10	+7.47	+0.05	54.88	0 52 40.50	[45.71]	. .
	ζ Virginis	.	7	4 12 54.64	+0.44	+0.07	−0.31	−0.60	+0.02	54.26	13 28 40.95	40.69	0.15
	Groom. 2029	.	7	4 18 37.31	+1.40	+0.24	+1.04	−1.94	+0.02	38.07	13 34 23.28	[45.21]	. .
	τ Bootis	E.	7	4 25 53.06	+0.54	+0.11	−0.17	−0.64	+0.01	52.01	13 41 30.51	40.60	0.06
	φ Virginis	W.	7	5 6 21.00	−0.43	+0.18	−0.15	+0.57	−0.03	21.14	14 22 7.00	40.52	0.02
	ρ Bootis	.	7	5 10 58.49	−0.63	+0.21	−0.02	+0.67	−0.03	58.69	14 26 45.28	40.59	0.05
	5 Ursæ Minoris	.	4	5 12 3.60	−1.72	+0.50	+0.66	+2.40	−0.03	5.41	14 27 51.74	[46.33]	. .
	π Bootis (pr.)	.	7	5 19 24.74	−0.54	+0.16	−0.08	+0.60	−0.04	24.84	14 35 11.26	46.42	0.12
	ϵ Bootis	.	7	5 24 3.82	−0.62	+0.18	−0.04	+0.64	−0.04	3.94	14 39 50.63	40.69	0.15
	β Ursæ Minoris	.	7	5 35 20.00	−1.58	+0.39	+0.58	+2.16	−0.05	21.50	14 51 7.06	[40.40]	. .
	2 H. Ursæ Minoris	.	7	5 39 57.76	−1.16	+0.26	+0.31	+1.42	−0.06	58.53	14 55 45.28	[46.75]	. .
	ψ Bootis	W.	7	5 43 37.32	−0.60	+0.12	−0.04	+0.64	−0.06	37.38	14 59 24.00	46.62	0.08

$a' = -0^s.544$ (circle E.); $a'' = -0^s.241$ (circle W.); $\epsilon = 0^s.588$ (— with circle E.).

Chronometer No. 1254, at $4^h\,36^m$ chron. time, $9^h\,15^m\,46^s.54$ | $0^s.028$ slow, gaining $0^s.053$ per hour.

$4^h\,50^m$ $9^h\,15^m\,46^s.53$

June 1	κ Draconis	E.	7	3 12 48.80	+1.32	−0.27	−1.44	−2.22	+0.12	46.31	12 28 20.90	+0 15 [40.68]	. .
	γ Virginis (med.)	.	7	3 19 59.61	+0.44	−0.09	+0.50	−0.74	+0.11	50.83	12 35 40.71	40.88	0.13
	α^2 Can. Venat	.	7	3 34 50.10	+0.69	−0.16	−0.07	−0.96	+0.10	49.70	12 50 30.40	40.76	0.01
	ϵ Virginis	.	7	3 40 37.36	+0.50	−0.12	+0.35	−0.76	+0.09	37.42	12 56 18.10	40.68	0.07
	Groom. 2001	.	5	4 7 31.92	+1.46	−0.30	−1.76	−2.02	+0.06	29.36	13 23 0.02	[40.26]	. .
	ζ Virginis	.	7	4 12 59.98	+0.44	−0.10	+0.49	−0.74	+0.05	0.12	13 28 40.03	40.81	0.06
	τ Bootis	.	7	4 25 58.84	+0.54	−0.15	+0.26	−0.78	+0.04	58.75	13 41 39.49	40.74	0.01
	ι Draconis	E.	7	4 32 21.61	+1.12	−0.33	−1.00	−1.78	+0.03	19.65	13 48 0.70	[41.05]	. .
	π Bootis (pr.)	W.	7	5 19 30.07	−0.54	+0.05	+0.45	+0.74	−0.02	30.75	14 35 11.25	40.50	0.25
	ϵ Bootis	.	7	5 24 9.48	−0.62	0.00	+0.21	+0.80	−0.03	9.84	14 39 50.02	40.78	0.03
	47 Cephei H. S. P.	.	3	5 34 34.03	+1.16	0.00	+6.30	−3.87	−0.04	37.67	2 50 10.03	[42.20]	. .
	2 H. Ursæ Minoris	.	7	5 40 5.21	−1.16	0.00	−1.73	+1.77	−0.04	4.05	14 55 45.20	[41.15]	. .
	ψ Bootis	.	1	5 43 42.96	−0.60	0.00	+0.21	+0.80	−0.05	43.32	14 59 24.00	40.68	0.07
	δ Bootis	.	7	5 55 4.63	−0.65	0.00	+0.05	+0.85	−0.06	4.82	15 10 45.52	40.70	0.05
	μ^1 Bootis	.	7	6 4 21.95	−0.68	0.00	−0.07	+0.90	0.07	22.03	15 20 2.92	40.89	0.14
	γ^2 Ursæ Minoris	.	6	6 5 19.89	−1.42	0.00	−2.75	+2.33	−0.07	17.98	15 20 59.35	[41.37]	. .
	β Coron. Bor.	.	7	6 7 17.62	−0.62	0.00	+0.16	+0.81	−0.08	17.89	15 22 58.62	40.73	0.02
	θ Coronæ	W.	7	6 12 30.02	−0.63	0.00	+0.10	+0.83	−0.08	30.24	15 28 11.05	40.81	0.09

$a' = +0^s.872$ (circle E.); $a'' = +1^s.345$ (circle W.); $\epsilon = 0^s.726$ (— with circle E.).

Chronometer No. 1254, at $5^h\,0^m$ chron. time, $9^h\,15^m\,40^s.75$ | $0^s.020$ slow, gaining $0^s.067$ per hour.

$4^h\,50^m$ $9^h\,15^m\,40^s.76$

Transits of stars observed at Shanghai, China, by Lieut. Commander F. M. Green, U. S. N., to determine the correction of sidereal chronometer Negus 1295.

Date.	Name of Star.	Circle.	No. of threads.	Transit over mean of threads.	Flexure.	Level.	Azimuth.	Aberration and collimation.	Rate.	Seconds of corr. transit.	R. A.	Chron. correction.	*v.*
1881.				*h.* *m.* *s.*	*s.*	*s.*	*s.*	*s.*	*s.*	*s.*	*h.* *m.* *s.*	*h.* *m.* *s.*	*s.*
July 17	19 H. Camelop. S. P.	E.	5	8 57 13.84	—0.52	+0.29	+28.28	—2.27	+0.02	39.64	5 3 1.55	+8 5 [21.91]	. .
	δ Herculis	.	6	9 4 47.46	+0.60	—0.36	+ 0.65	+0.47	+0.01	48.83	17 10 12.05	23.22	0.06
	α Ophiuchi	.	7	9 24 2.56	+0.56	—0.33	+ 1.80	+0.44	+0.01	5.04	17 29 28.33	23.29	0.13
	ω Draconis	.	7	9 32 26.78	+1.21	—0.72	— 9.19	+1.19	+0.01	19.28	17 37 41.88	[22.60]	. .
	μ Herculis	.	7	9 36 27.36	+0.62	—0.36	+ 0.38	+0.49	+0.01	28.50	17 41 51.57	23.07	0.09
	χ Draconis	.	7	9 38 53.69	+1.36	—0.77	—11.70	+1.41	0.00	43.99	17 44 6.30	[22.31]	. .
	ξ Herculis	E.	7	9 47 47.99	+0.63	—0.36	+ 0.22	+0.49	0.00	48.97	17 53 11.94	+8 5 22.97	0.19
	ζ Aquilæ	W.	7	10 54 36.53	—0.56	—0.25	+ 1.76	—0.40	0.00	37.03	19 0 0.25	+8 5 23.22	0.06
	τ Draconis	.	7	11 12 47.16	—1.41	—0.64	—13.09	—1.35	—0.01	30.66	19 17 53.87	[23.21]	0.05
	β Cygni	.	7	11 20 36.99	—0.62	—0.28	+ 0.40	—0.44	—0.01	36.04	19 25 59.06	23.02	0.14
	β Aquilæ	.	7	11 44 7.62	—0.50	—0.23	+ 2.45	—0.39	—0.01	8.94	19 49 32.06	23.12	0.04
	τ Aquilæ	W.	7	11 52 59.13	—0.50	—0.24	+ 2.33	—0.39	—0.01	0.32	19 58 23.62	23.30	0.14

$a' = +5^s.44$ (circle E.); $a'' = +5^s.69$ (circle W.); $c = 0^s.41$ (+ with circle E.).

Chronometer No. 1295, at $10^h\ 20^m$ chron. time, $8^h\ 5^m\ 23^s.16 \pm 0^s.026$ slow, gaining $0^s.01$ per hour.

July 18	β Herculis	E.	7	8 19 42.97	+0.58	—0.10	+ 2.46	+0.51	0.00	46.42	16 25 9.54	+8 5 23.12	0.15
	A Draconis	.	7	8 23 14.08	+1.21	—0.26	—23.79	+1.36	0.00	52.60	16 28 15.67	[23.07]	. .
	ζ Herculis	.	7	8 31 27.18	+0.65	—0.18	— 0.17	+0.55	0.00	28.03	16 36 51.20	23.17	0.20
	$\varkappa$ Ophiuchi	.	7	8 46 36.81	+0.52	—0.17	+ 5.19	+0.48	0.00	42.83	16 52 5.74	22.91	0.06
	ε Herculis	.	7	8 50 23.60	+0.64	—0.23	+ 0.04	+0.55	0.00	24.60	16 55 47.45	22.85	0.12
	ε Ursæ Minoris . .	.	6	8 54 6.44	+2.56	—1.02	—79.88	+3.48	0.00	51.58	16 58 14.31	[22.73]	. .
	α^1 Herculis	.	6	9 3 48.95	+0.54	—0.22	+ 4.12	+0.48	0.00	44.02	17 9 16.86	22.84	0.13
	ϑ Herculis	E.	5	9 4 46.60	+0.60	—0.24	+ 1.67	+9.52	0.00	49.15	17 10 12.03	+8 5 22.88	0.09
	ω Draconis	W.	7	9 32 44.31	—1.21	—0.83	—22.43	—1.19	0.00	18.65	17 37 41.86	+8 5 [23.21]	. .
	μ Herculis	.	7	9 36 28.96	—0.62	—0.42	+ 0.90	—0.49	0.00	28.33	17 41 51.56	23.23	0.26
	χ Draconis	.	7	9 39 15.78	—1.36	—0.89	—28.53	—1.41	0.00	43.59	17 44 6.26	[22.67]	. .
	ξ Herculis	.	7	9 47 50.02	—0.63	—0.40	+ 0.52	—0.49	0.00	49.02	17 53 11.94	22.92	0.05
	o Herculis	W.	7	9 57 35.66	—0.63	—0.39	+ 0.65	—0.49	0.00	34.80	18 2 57.57	+8 5 22.77	0.20

$a' = +13^s.89$ (circle E.); $a'' = 13^s.29$ (circle W.); $c = 0^s.45$ (+ with circle E.).

Chronometer No. 1295, at $9^h\ 8^m$ chron. time, $8^h\ 5^m\ 22^s.97 \pm 0^s.037$ slow, gaining $0^s.02$ per hour.

$10^h\ 37^m$ $8^h\ 5^m\ 22^s.94$

Transits of stars observed at Wladiwostok, Siberia, by Lieut. John A. Norris, U. S. N., to determine the correction of sidereal chronometer Negus 1519.

Date.	Name of Star.	Circle.	No. of threads.	Transit over mean of threads.	Flexure.	Level.	Azimuth.	Aberration and collimation.	Rate.	Seconds of corr. transit.	R. A.	Chron. correction.	v.
1881.				*h.* *m.* *s.*	*s.*	*s.*	*s.*	*s.*	*s.*	*s.*	*h.* *m.* *s.*	*h.* *m.* *s.*	*s.*
July 17	α Bootis	E.	7	5 24 17.19	+0.27	−0.04	+0.16	+0.08	+0.02	17.68	14 10 16.70	+8 45 59.02	0.07
	γ Bootis	.	7	5 41 20.21	+0.35	−0.04	+0.04	+0.10	+0.02	20.68	14 27 19.64	58.96	0.01
	ε Bootis	.	7	5 53 50.68	+0.30	−0.02	+0.11	+0.09	+0.01	51.17	14 39 50.17	59.00	0.05
	β Ursæ Minoris . .	.	7	6 5 5.69	+0.88	−0.03	−0.73	+0.30	+0.01	6.11	14 51 4.99	[58.88]	. .
	β Bootis	.	7	6 11 31.03	+0.36	−0.00	+0.02	+0.10	+0.01	31.52	14 57 30.41	58.89	0.06
	δ Bootis	.	7	6 24 45.74	+0.33	+0.01	+0.07	+0.10	0.00	46.25	15 10 45.10	58.85	0.10
	γ^2 Ursæ Minoris . .	E.	7	6 34 57.70	+0.79	+0.05	−0.59	+0.10	0.00	58.01	15 20 57.20	[59.19]	. .
	ν Bootis (pr.) . . .	W.	7	6 40 43.21	−0.36	+0.41	−0.00	−0.14	0.00	43.12	15 26 42.02	58.90	0.05
	ν Bootis (seq.) . . .	.	7	6 41 35.39	−0.37	+0.41	−0.00	−0.15	0.00	35.28	15 27 34.09	58.81	0.14
	α Coron. Bor. . . .	.	7	6 43 43.07	−0.30	+0.33	−0.01	−0.12	0.00	43.97	15 29 41.96	58.99	0.04
	γ Camelop. H. S. P.	.	7	6 51 53.61	+0.34	+0.26	−0.10	+0.24	−0.01	54.34	3 37 52.74	[58.40]	. .
	β Serpentis	.	7	6 54 46.50	−0.25	−0.19	−0.02	−0.11	−0.01	45.92	15 40 44.92	59.00	0.05
	ε Serpentis	.	7	6 58 57.94	−0.22	−0.16	−0.02	−0.11	−0.01	57.42	15 44 56.50	59.08	0.13
	ζ Ursæ Minoris . .	.	7	7 2 24.99	−1.10	−0.78	+0.10	−0.53	−0.01	22.67	15 48 21.47	[58.80]	. .
	Groom. 2320 . . .	.	7	7 20 5.02	−0.67	−0.43	+0.04	−0.29	−0.02	3.65	16 6 2.11	[58.46]	. .
	6 Coron. Bor. med.	.	7	7 24 17.95	−0.35	−0.22	−0.00	−0.14	−0.02	17.22	16 10 16.28	59.06	0.11
	19 Ursæ Minoris . .	.	7	7 28 18.98	−0.96	−0.59	+0.08	−0.46	−0.02	17.03	16 14 15.71	[58.68]	. .
	τ Herculis	W.	7	7 30 14.63	−0.40	−0.24	+0.00	−0.16	−0.02	13.81	16 16 12.70	58.89	0.06

$a' = +0^s.370$ (circle E.); $a'' = -0^s.036$ (circle W.); $c = 0^s.094$ (+ with circle E.).

Chronometer No. 1519, at $6^h\ 30^m$ chron. time, $8^h\ 45^m\ 58^s.95 \pm 0^s.017$ slow, gaining $0^s.022$ per hour.

$10^h\ 32^m$ $8^h\ 45^m\ 58^s.86$

July 18	β Bootis	W.	7	6 11 32.59	−0.36	−0.30	+0.02	+0.01	+0.02	31.95	14 57 30.39	+8 45 58.41	0.09
	δ Bootis	.	7	6 24 47.16	−0.33	−0.21	+0.07	+0.00	+0.02	46.71	15 10 45.08	58.37	0.05
	1 H. Ursæ Minoris.	.	7	6 27 21.58	−0.66	−0.40	−0.38	+0.01	+0.01	20.22	15 13 18.37	[58.15]	. .
	γ^2 Ursæ Minoris . .	.	7	6 35 0.36	−0.79	−0.34	−0.55	+0.01	+0.01	58.70	15 20 57.14	[58.44]	. .
	β Coron. Bor. . . .	.	7	6 37 0.30	−0.31	−0.12	+0.09	+0.00	+0.01	59.97	15 22 58.26	58.29	0.03
	ν Bootis (pr.) . . .	.	7	6 40 44.22	−0.36	−0.11	+0.02	+0.01	+0.01	43.79	15 26 42.01	58.22	0.10
	ν Bootis (seq.) . . .	.	7	6 41 36.24	−0.37	−0.10	+0.01	+0.01	+0.01	35.80	15 27 34.08	58.28	0.04
	φ Bootis	.	7	6 47 38.13	−0.36	−0.13	+0.02	+0.01	0.00	37.67	15 33 35.96	58.29	0.03
	ζ Coronæ (seq.) . .	W.	7	6 48 58.63	−0.34	−0.13	+0.05	+0.01	0.00	58.22	15 34 56.57	58.35	0.03
	ε Serpentis	E.	7	6 58 58.03	+0.22	−0.25	+0.23	−0.03	0.00	58.20	15 44 56.49	58.29	0.03
	Groom. 2320 . . .	.	7	7 20 3.33	+0.67	+0.30	−0.42	−0.09	−0.01	3.78	16 6 2.07	[58.29]	. .
	6 Coron. Bor. . . .	.	7	7 24 17.39	+0.35	+0.18	+0.03	−0.04	−0.01	17.90	16 10 16.27	58.37	0.05
	19 Ursæ Minoris . .	.	7	7 28 16.81	+0.96	+.54	−0.85	−0.14	−0.01	17.31	16 14 15.63	[58.32]	. .
	τ Herculis	.	7	7 30 13.74	+0.40	+0.23	−0.03	−0.05	−0.01	14.28	16 16 12.68	58.40	0.08
	η Ursæ Minoris . .	.	7	7 35 2.77	+0.96	+0.62	−0.83	−0.14	−0.01	3.37	16 21 1.62	[58.25]	. .
	6 Herculis	.	7	7 44 20.06	+0.37	+0.29	+0.00	−0.05	−0.02	20.65	16 30 18.97	58.32	0.00
	ς Herculis	.	7	7 50 52.23	+0.32	+0.28	+0.09	−0.04	−0.02	52.86	16 36 51.20	58.34	0.02
	η Herculis	E.	7	7 52 53.14	+0.35	+0.32	+0.03	−0.04	−0.02	53.78	16 38 52.02	58.24	0.08

$a' = +0^s.347$ (circle W.); $a'' = +0^s.371$ (circle E.); $c = 0^s.019$ (— with circle E.).

Chronometer No. 1519, at $7^h\ 0^m$ chron. time, $8^h\ 45^m\ 58^s.32 \pm 0^s.011$ slow, gaining $0^s.025$ per hour.

$10^h\ 37^m$ $8^h\ 45^m\ 58^s.23$

Transits of stars observed at Wladiwostok, Siberia, by Lieut. John A. Norris, U. S. N., to determine the correction of sidereal chronometer Negus 1519.

Date.	Name of Star.	Circle.	No. of threads.	Transit over mean of threads.	Flexure.	Level.	Azimuth.	Aberration and collimation.	Rate.	Seconds of corr. transit.	R. A.	Chron. correction.	*v.*
1881.				*h.* *m.* *s.*	*s.*	*s.*	*s.*	*s.*	*s.*	*s.*	*h.* *m.* *s.*	*h.* *m.* *s.*	*s.*
July 22	α Camelop., S. P.	E.	7	7 56 21.36	—0.22	—0.12	+0.43	—0.11	+0.05	21.39	4 42 16.79	+8 45 [55.40]	. .
	α Ophiuchi	.	7	8 43 32.36	+0.24	+0.04	+0.10	+0.02	+0.03	32.79	17 29 28.30	55.51	0.06
	μ Herculis	.	7	8 55 55.43	+0.30	+0.06	+0.05	+0.02	+0.03	55.89	17 41 51.54	55.65	0.08
	ψ^1 Draconis	.	2	8 58 9.85	+0.79	+0.15	—0.29	+0.05	+0.02	10.56	17 44 6.10	[55.54]	. .
	ϑ Herculis	.	7	9 6 17.55	+0.34	+0.15	+0.02	+0.02	+0.02	18.10	17 52 13.63	55.53	0.04
	ξ Herculis	.	7	9 7 15.83	+0.31	+0.14	+0.05	+0.02	+0.02	16.37	17 53 11.91	55.54	0.03
	35 Draconis	E.	4	9 8 52.86	+1.01	+0.52	—0.45	+0.07	+0.02	54.03	17 54 49.37	[55.34]	. .
	φ Draconis	W.	5	9 36 36.69	—0.76	—0.49	—0.31	—0.14	+0.01	35.00	18 22 30.92	[55.92]	. .
	α Lyræ	.	7	9 47 2.92	—0.35	—0.19	+0.02	—0.06	0.00	2.34	18 32 58.06	55.72	0.15
	β Lyræ	.	7	9 59 49.67	—0.32	—0.14	+0.04	—0.05	0.00	49.20	18 45 44.78	55.58	0.01
	ζ Aquilæ	.	7	10 14 5.10	—0.25	—0.10	+0.11	—0.05	0.00	4.81	19 0 0.32	55.51	0.06
	γ Cygni	.	7	11 32 6.32	—0.36	0.00	+0.02	—0.06	—0.04	5.88	20 18 1.32	55.44	0.13
	ε Delphini	.	7	11 41 40.41	—0.24	—0.13	+0.11	—0.05	—0.04	40.06	20 27 35.66	55.60	0.03
	Groom. 3241	.	7	11 44 41.43	—0.78	—0.41	—0.33	—0.15	—0.04	39.69	20 30 35.02	[55.33]	. .
	α Cygni	W.	7	11 51 31.55	—0.39	—0.22	—0.09	—0.06	—0.04	30.75	20 37 26.36	55.61	0.04

$a' = +0^s.183$ (circle E.); $a'' = +0^s.208$ (circle W.); $c = 0^s.030$ (+ with circle E.).

Chronometer No. 1519, at $10^h\,0^m$ chron. time, $8^h\,45^m\,55^s.57 \pm 0^s.018$ slow, gaining $0^s.023$ per hour.

$10^h\,39^m$ $8^h\,45^m\,55^s.56$

July 23	γ Coronæ	W.	7	6 51 53.00	—0.30	—0.18	+0.02	+0.03	+0.02	52.59	15 37 47.66	+8 45 55.07	0.08
	β Serpentis	.	7	6 54 50.12	—0.25	—0.16	+0.03	+0.03	+0.02	49.79	15 40 44.85	55.06	0.09
	ε Serpentis	.	7	6 59 1.50	—0.22	—0.14	+0.04	+0.03	+0.02	1.23	15 44 56.43	55.20	0.05
	ζ Ursæ Minoris	.	7	7 2 28.07	—1.10	—0.73	—0.20	+0.13	+0.01	26.18	15 48 20.89	[54.71]	. .
	γ Serpentis	.	7	7 5 5.86	—0.26	—0.17	+0.03	+0.03	+0.01	5.50	15 51 0.58	55.08	0.07
	ε Coron. Bor.	.	7	7 6 47.83	—0.30	—0.20	+0.02	+0.03	+0.01	47.39	15 52 42.70	55.31	0.16
	Groom. 2320	.	7	7 20 8.06	—0.67	—0.31	—0.08	+0.07	+0.01	7.08	16 6 1.82	[54.74]	. .
	6 Coron. Bor. med.	.	7	7 24 21.39	—0.35	—0.14	+0.01	+0.03	+0.01	20.95	16 10 16.19	55.24	0.09
	19 Ursæ Minoris	.	7	7 28 21.89	—0.96	—0.32	—0.16	+0.11	0.00	20.56	16 14 15.24	[54.68]	. .
	τ Herculis	.	7	7 30 17.94	—0.40	—0.12	—0.01	+0.04	0.00	17.45	16 16 12.58	55.13	0.02
	ω Herculis	W.	7	7 34 3.93	—0.25	—0.06	+0.04	+0.03	0.00	3.69	16 19 58.75	55.06	0.09
	Groom. 2373	E.	7	7 49 51.33	+1.06	+1.02	+0.14	—0.26	0.00	53.29	16 35 48.23	[54.94]	. .
	η Herculis	.	7	7 52 56.20	+0.35	+0.31	—0.00	—0.07	0.00	56.79	16 38 51.94	55.15	0.00
	α Camelop. S. P.	.	7	7 56 22.16	—0.22	—0.18	—0.12	+0.06	0.00	21.70	4 42 16.84	[55.14]	. .
	49 Herculis	.	7	8 0 47.83	+0.25	+0.17	—0.03	—0.06	0.00	48.16	16 46 43.25	55.09	0.06
	$\varkappa$ Ophiuchi	.	7	8 6 10.23	+0.23	+0.18	—0.03	—0.06	—0.01	10.55	16 52 5.71	55.17	0.02
	ε Herculis	.	7	8 9 51.67	+0.31	+0.27	—0.01	—0.07	—0.01	52.16	16 55 47.40	55.24	0.09
	d Herculis	.	7	8 11 20.23	+0.33	+0.29	—0.01	—0.07	—0.01	20.76	16 57 15.93	55.17	0.02
	60 Herculis	.	7	8 13 59.63	+0.24	+0.23	—0.03	—0.06	—0.01	0.00	16 59 55.13	55.13	0.02
	19 H. Camelop. S. P.	.	7	8 17 8.54	—0.80	—0.80	—0.23	+0.14	—0.01	6.84	5 3 2.19	[55.35]	. .
	α^1 Herculis	.	7	8 23 21.27	+0.25	+0.29	—0.03	—0.06	—0.01	21.71	17 9 16.83	55.12	0.03
	δ Herculis	E.	7	8 24 16.30	+0.29	+0.34	—0.02	—0.06	—0.01	16.84	17 10 11.99	55.15	0.00

$a' = +0^s.071$ (circle W.); $a'' = -0^s.053$ (circle E.); $c = 0^s.041$ (— with circle E.).

Chronometer No. 1519, at $7^h\,45^m$ chron. time, $8^h\,45^m\,55^s.15 \pm 0^s.012$ slow, gaining $0^s.019$ per hour.

$10^h\,50^m$ $8^h\,45^m\,55^s.09$

Transits of stars observed at Nagasaki, Japan, by Lieut. Commander C. H. Davis, U. S. N., to determine the correction of sidereal chronometer Negus 1254.

Date.	Name of Star.	Circle.	No. of threads.	Transit over mean of threads.	Flexure.	Level.	Azimuth.	Aberration and collimation.	Rate.	Seconds of corr. transit.	R. A.	Chron. correction.	*v.*
1881.				*h. m. s.*	*s.*	*s.*	*s.*	*s.*	*s.*	*s.*	*h. m. s.*	*h. m. s.*	*s.*
July 22	κ Ophiuchi.	W.	7	8 15 50.55	—0.50	—0.06	—0.17	—0.01	—0.06	49.75	16 52 5.72	+8 36 15.97	0.09
	ε Herculis	.	7	8 19 32.11	—0.63	—0.05	—0.01	—0.01	—0.06	31.35	16 55 47.41	16.06	0.00
	ε Ursæ Minoris . .	.	7	8 21 59.11	—2.60	—0.15	+2.45	—0.07	—0.05	58.69	16 58 13.80	[15.11]	. .
	ζ Draconis.	.	7	8 32 13.64	—1.11	—0.11	+0.58	—0.02	—0.04	12.94	17 8 29.24	[16.30]	. .
	δ Herculis	.	7	8 33 56.58	—0.59	—0.07	—0.06	—0.01	—0.03	55.82	17 10 12.00	16.18	0.12
	π Hereulis	.	7	8 34 41.83	—0.67	—0.08	+0.04	—0.01	—0.03	41.08	17 10 57.32	16.24	0.18
	α Ophiuchi.	W.	7	8 53 13.16	—0.52	—0.09	—0.15	—0.01	0.00	12.39	17 29 28.31	15.92	0.14
	β Ophiuchi.	E.	7	9 1 23.34	+0.48	—0.25	—0.12	—0.03	+0.01	23.43	17 37 39.46	16.03	0.03
	μ Herculis	.	7	9 5 35.11	+0.61	—0.32	—0.02	—0.03	+0.02	35.37	17 41 51.54	16.17	0.11
	ψ^1 Draconis.	.	7	9 7 48.47	+1.36	—0.72	+0.52	—0.09	+0.02	49.56	17 44 6.10	[16.54]	. .
	θ Herculis	.	7	9 15 57.23	+0.68	—0.38	+0.02	—0.03	+0.04	57.56	17 52 13.63	16.07	0.01
	ξ Herculis	.	7	9 16 55.57	+0.62	—0.35	—0.02	—0.03	+0.04	55.83	17 53 11.91	16.08	0.02
	35 Draconis	.	6	9 18 31.85	+1.72	—1.00	+0.77	—0.12	+0.04	33.26	17 54 49.37	[16.11]	. .
	δ Ursæ Minoris . .	.	7	9 34 24.74	+5.34	—2.83	+3.40	—0.44	+0.07	30.28	18 10 45.64	[15.36]	. .
	109 Herculis	E.	7	9 42 25.07	+0.57	—0.28	—0.05	—0.03	+0.08	25.36	18 18 41.29	15.93	0.13

$a' = -0^s.435$ (circle W.); $a'' = -0^s.249$ (circle E.); $c = 0^s.008$ (— with circle E.).

Chronometer No. 1254, at $8^h\,54^m$ chron. time, $8^h\,36^m\,16^s.06 \pm 0^s.023$ slow, losing $0^s.098$ per hour.

$10^h\,41^m$ $8^h\,36^m\,16^s.24$

July 23	A Draconis.	E.	7	7 51 57.35	+1.22	+0.07	—2.29	+0.20	—0.08	56.47	16 28 15.44	+8 36 [18.97]	. .
	Groom. 2373. . .	.	7	7 59 32.98	+1.79	+0.14	—4.69	+0.33	—0.07	30.48	16 35 48.24	[17.76	. .
	η Herculis	.	7	8 2 32.83	+0.69	+0.06	—0.20	+0.09	—0.06	33.41	16 38 51.94	18.53	0.03
	49 Herculis	.	7	8 10 23.73	+0.53	+0.03	+0.44	+0.07	—0.05	24.78	16 46 43.25	18.47	0.03
	κ Ophiuchi.	.	7	8 15 46.03	+0.50	+0.05	+0.56	+0.07	—0.04	47.17	16 52 5.71	18.54	0.04
	ε Herculis	.	7	8 19 28.06	+0.63	+0.08	+0.05	+0.08	—0.04	28.86	16 55 47.40	18.54	0.04
	d Herculis	.	7	8 20 56.72	+0.65	+0.08	—0.03	+0.09	—0.03	57.48	16 57 15.93	18.45	0.05
	60 Herculis	.	7	8 23 35.51	+0.52	+0.08	+0.49	+0.07	—0.03	36.64	16 59 55.12	18.48	0.02
	ζ Draconis.	.	7	8 32 11.15	+1.11	+0.13	—1.89	+0.17	—0.01	10.66	17 8 29.20	[18.54]	. .
	δ Herculis	E.	7	8 33 52.60	+0.59	+0.07	+0.21	+0.08	—0.01	53.54	17 10 11.99	18.45	0.05
	α Ophiuchi.	W.	7	8 53 9.75	—0.52	+0.12	+0.53	—0.11	+0.02	9.79	17 29 28.30	18.51	0.01
	ω Draconis.	.	7	9 1 26.54	—1.21	+0.28	—2.44	—0.30	+0.04	22.91	17 37 41.68	[18.77]	. .
	μ Herculis	.	7	9 5 33.38	—0.61	+0.14	+0.15	—0.12	+0.04	32.98	17 41 51.54	18.56	0.06
	ψ^1 Draconis.	.	7	9 7 52.08	—1.36	+0.32	—3.11	—0.35	+0.05	47.63	17 44 6.05	[18.42]	. .
	θ Herculis	.	7	9 15 55.82	—0.68	+0.19	—0.15	—0.13	+0.06	55.11	17 52 13.62	18.51	0.01
	ξ Herculis	.	7	9 16 53.80	—0.62	+0.17	+0.10	—0.12	+0.06	53.39	17 53 11.91	18.52	0.02
	35 Draconis.	.	7	9 18 37.30	—1.72	+0.50	—4.63	—0.47	+0.07	31.05	17 54 49.31	[18.26]	. .
	o Herculis	W.	7	9 26 39.54	—0.62	+0.14	+0.12	—0.12	+0.08	39.14	18 2 57.54	18.40	0.10

$a' = +1^s.416$ (circle E.); $a'' = +1^s.496$ (circle W.); $c = 0^s.089$ (+ with circle E.).

Chronometer No. 1254, at $8^h\,40^m$ chron. time, $8^h\,36^m\,18^s.50 \pm 0^s.009$ slow, losing $0^s.102$ per hour.

$10^h\,52^m$ $8^h\,36^m\,18^s.72$

Transits of stars observed at Shanghai, China, by Lieut. Commander F. M. Green, U. S. N., to determine the correction of sidereal chronometer Negus 1295.

Date.	Name of Star.	Circle.	No. of threads.	Transit over mean of threads.	Flexure.	Level.	Azimuth.	Aberration and collimation.	Rate.	Seconds of corr. transit.	R. A.	Chron. correction.	*v.*
1881.				*h.* *m.* *s.*	*s.*	*s.*	*s.*	*s.*	*s.*	*s.*	*h.* *m.* *s.*	*h.* *m.* *s.*	*s.*
July 19	ζ Herculis	W.	7	8 31 29.43	—0.65	—0.04	0.00	—0.55	+0.01	28.20	16 36 51.18	+8 5 22.98	0.04
	ε Herculis	.	7	8 50 25.78	—0.64	—0.11	0.00	—0.55	+0.01	24.49	16 55 47.44	22.95	0.01
	ε Ursæ Minoris . .	.	7	8 52 56.69	—2.56	—0.51	+1.04	—3.48	+0.01	51.19	16 58 14.18	[22.99]	. .
	ζ Draconis	.	7	9 3 8.51	—1.11	—0.30	+0.25	—1.15	+0.01	6.21	17 8 29.34	[23.13]	. .
	δ Herculis	.	7	9 4 50.45	—0.60	—0.19	—0.02	—0.52	0.00	49.12	17 10 12.02	22.90	0.04
	α Ophiuchi	.	6	9 24 6.42	—0.53	—0.18	—0.06	—0.48	0.00	5.17	17 29 28.32	23.15	0.21
	ω Draconis	.	7	9 32 21.68	—1.21	—0.42	+0.30	—1.30	0.00	19.05	17 37 41.82	[22.77]	. .
	χ Draconis	W.	7	9 38 46.62	—1.36	—0.47	+0.39	—1.53	0.00	43.65	17 44 6.22	+8 5 [32.57]	. .
	ξ Herculis	E.	7	9 47 47.99	+0.63	—0.07	0.00	+0.58	0.00	49.13	17 53 11.93	+8 5 22.80	0.14
	35 Draconis	.	6	9 49 23.17	+1.70	—0.25	0.00	+2.26	0.00	26.88	17 54 49.55	[22.67]	. .
	o Herculis	.	7	9 57 33.48	+0.63	—0.11	0.00	+0.58	0.00	34.58	18 2 57.56	22.98	0.04
	ϑ Ursæ Minoris . .	.	7	10 5 11.86	+5.29	—1.15	0.00	+8.63	0.00	24.63	18 10 46.32	[21.69]	. .
	ε Aquilæ	.	7	10 48 53.40	+0.55	—0.16	0.00	+0.53	—0.01	54.31	18 54 17.14	22.83	0.11
	ζ Aquilæ	E.	7	10 54 36.46	+0.54	—0.13	0.00	+0.52	—0.01	37.38	19 0 0.31	+8 5 22.93	0.01

$a = -0^s.18$ (circle W.); $a' = 0^s.00$ (circle E.); $c = 0^s.49$ (+ with circle E.).

Chronometer No. 1295, at $9^h\,42^m$ chron. time, $8^h\,5^m\,22^s.94 \pm 0^s.025$ slow, gaining 0.01 per hour.

$10^h\,22^m$ $8^h\,5^m\,22^s.93$

July 21	η Ursæ Minoris . .	W.	7	8 15 40.36	—1.62	—0.09	+0.23	—0.99	—0.02	37.87	16 21 1.39	+8 5 [23.52]	. .
	λ Ophiuchi	.	7	8 19 35.69	—0.48	—0.03	—0.04	—0.24	—0.02	34.88	16 24 58.32	23.44	0.17
	ζ Herculis	.	7	8 31 28.50	—0.65	—0.04	0.00	—0.28	—0.02	27.51	16 36 51.16	23.65	0.04
	κ Ophiuchi	.	7	8 46 43.01	—0.52	—0.07	—0.03	—0.24	—0.01	42.14	16 52 5.72	23.58	0.03
	ε Herculis	.	7	8 50 24.87	—0.64	—0.30	0.00	—0.28	—0.01	23.64	16 55 47.42	23.78	0.17
	ε Ursæ Minoris . .	.	7	8 52 55.04	—2.56	—0.70	+0.46	—1.78	0.00	50.46	16 58 13.92	[23.46]	. .
	α Herculis	W.	7	9 3 54.06	—0.54	—0.19	—0.02	—0.25	0.00	53.06	17 9 16.85	+8 5 23.79	0.18
	α Ophiuchi	E.	7	9 24 3.57	+0.53	+0.04	+0.20	+0.29	0.00	4.63	17 29 28.31	+8 5 23.68	0.07
	ω Draconis	.	7	9 32 17.36	+1.21	+0.09	—1.03	+0.77	0.00	18.40	17 37 41.75	[23.35]	. .
	μ Herculis	.	7	9 36 27.01	+0.62	+0.03	+0.04	+0.32	0.00	28.02	17 41 51.55	23.53	0.08
	ξ Herculis	.	7	9 47 47.30	+0.63	+0.05	+0.02	+0.32	+0.01	48.33	17 53 11.92	23.59	0.02
	o Herculis	.	7	9 57 32.93	+0.63	+0.05	+0.03	+0.32	+0.02	33.98	18 2 57.55	23.57	0.04
	ϑ Ursæ Minoris . .	.	7	10 5 20.29	+5.29	+0.58	—8.49	+4.74	+0.02	22.43	18 10 45.86	[23.43]	. .
	109 Herculis	E.	7	10 13 16.74	+0.58	+0.04	+0.11	+0.30	+0.02	17.79	18 18 41.30	23.51	0.10

$a' = -0^s.08$ (circle W.); $a'' = +0^s.61$ (circle E.); $c = 0^s.26$ (+ with circle E.).

Chronometer No. 1295 at $9^h\,13^m$ chron. time, $8^h\,5^m\,23^s.61 \pm 0^s.024$ slow, losing $0^s.02$ per hour.

$10^h\,30^m$ $8^h\,5^m\,23^s.64$

Transits of stars observed at Nagasaki, Japan, by Lieut. Commander C. H. Davis, U. S. N., to determine the correction of sidereal chronometer Negus 1254.

Date.	Name of Star.	Circle.	No. of threads.	Transit over mean of threads.	Flexure.	Level.	Azimuth.	Aberration and collimation.	Rate.	Seconds of corr. transit.	R. A.	Chron. correction.	v.
1881.				h. m. s.	s.	s.	s.	s.	s.	s.	h. m. s.	h. m. s.	s.
July 19	Groom. 2373 . . .	W.	7	7 59 39.77	−1.79	+0.10	+1.01	+1.01	−0.09	40.01	16 35 48.58	+8 36 [8.57]	. .
	49 Herculis	.	7	8 10 34.73	−0.53	−0.03	−0.10	+0.22	−0.07	34.22	16 46 43.28	9.06	0.13
	κ Ophiuchi	.	7	8 15 57.12	−0.50	−0.02	−0.12	+0.22	−0.06	56.64	16 52 5.74	9.10	0.09
	ε Herculis	.	7	8 19 38.71	−0.63	−0.01	−0.10	+0.25	−0.05	38.17	16 55 47.44	9.27	0.08
	60 Herculis	.	7	8 23 46.63	−0.52	0.00	−0.11	+0.22	−0.04	46.18	16 59 55.15	8.97	0.22
	ζ Draconis	.	7	8 32 20.31	−1.11	−0.05	+0.41	+0.53	−0.03	20.06	17 8 29.34	[9.28]	. .
	δ Herculis	.	7	8 34 3.27	−0.59	−0.03	−0.05	+0.24	−0.03	2.81	17 10 12.02	9.21	0.02
	π Herculis	W.	7	8 34 48.47	−0.67	−0.04	+0.03	+0.27	−0.02	48.04	17 10 57.35	9.31	0.12
	α Ophiuchi	E.	7	8 53 19.12	+0.52	−0.09	−0.11	−0.36	+0.01	19.09	17 29 28.32	9.23	0.04
	ω Draconis	.	7	9 1 31.39	+1.21	−0.35	+0.52	−0.97	+0.02	31.82	17 37 41.83	[10.01]	. .
	μ Herculis	.	7	9 5 42.15	+0.61	−0.13	−0.03	−0.40	+0.03	42.23	17 41 51.56	9.33	0.14
	ψ¹ Draconis	.	7	9 7 56.44	+1.36	−0.24	+0.66	−0.15	+0.03	57.10	17 44 6.22	[9.12]	. .
	θ Herculis	.	7	9 16 4.24	+0.68	−0.15	+0.03	−0.44	+0.05	4.41	17 52 13.65	9.24	0.05
	ξ Herculis	.	7	9 17 2.50	+0.62	−0.14	−0.02	−0.40	+0.05	2.61	17 53 11.93	9.32	0.13
	35 Draconis	.	5	9 18 39.75	+1.72	−0.40	+0.99	−1.56	+0.05	40.55	17 54 49.55	[9.00]	. .
	72 Ophiuchi	.	7	9 25 37.20	+0.50	−0.09	−0.13	−0.36	+0.07	37.19	18 1 46.28	9.09	0.10
	o Herculis	E.	7	9 26 48.26	+0.62	−0.11	−0.03	−0.40	+0.07	48.41	18 2 57.50	9.15	0.04

$a' = -0^s.305$ (circle W.); $a'' = -0^s.319$ (circle E.); $c = 0^s.234$ (− with circle E.).

Chronometer No. 1254, at $8^h\,49^m$ chron. time, $8^h\,36^m\,9^s.19 \pm 0^s.023$ slow, losing $0^s.107$ per hour.

$10^h\,25^m$ $8^h\,36^m\,9^s.36$

July 21	γ Herculis	E.	7	7 40 29.24	+0.56	−0.08	−0.05	+0.06	−0.07	29.66	16 16 43.47	+8 36 13.81	0.06
	η Ursæ Minoris . .	.	6	7 44 45.46	+1.63	−0.28	+0.61	+0.23	−0.06	47.59	16 21 1.39	[13.80]	. .
	β Herculis	.	7	7 48 55.13	+0.57	−0.09	−0.04	+0.06	−0.05	55.58	16 25 9.49	13.91	0.04
	d Draconis	.	7	7 51 59.72	+1.22	−0.18	+0.35	+0.15	−0.05	1.21	16 28 15.54	[14.33]	. .
	Groom. 2373 . . .	.	7	7 59 32.34	+1.79	−0.30	+0.71	+0.26	−0.04	34.76	16 35 48.41	[13.65]	. .
	η Herculis	.	6	8 2 37.51	+0.69	−0.12	+0.03	+0.07	−0.03	38.15	16 38 51.97	13.82	0.05
	49 Herculis	.	7	8 10 29.01	+0.53	−0.09	−9.07	+0.06	−0.02	29.42	16 46 43.27	13.85	0.02
	κ Ophiuchi	E.	7	8 15 51.48	+0.50	−0.07	−0.09	+0.06	−0.01	51.87	16 52 5.73	13.86	0.01
	ε Herculis	W.	7	8 19 34.04	−0.63	+0.04	−0.01	−0.11	0.00	33.33	16 55 47.42	14.09	0.22
	ε Ursæ Minoris . .	.	5	8 22 1.46	−2.60	+0.15	+2.02	−0.67	0.00	0.36	16 58 13.94	[13.58]	. .
	ζ Draconis	.	7	8 32 15.91	−1.11	+0.04	+0.48	−0.22	+0.01	15.11	17 8 29.27	[14.16]	. .
	π Herculis	.	7	8 34 44.26	−0.67	0.00	+0.03	−0.11	+0.02	43.53	17 10 57.33	13.80	0.07
	α Ophiuchi	.	7	8 53 15.32	−0.52	−0.09	−0.13	−0.09	+0.05	14.54	17 29 28.31	13.77	0.10
	β Ophiuchi	.	7	9 1 26.41	−0.48	−0.06	−0.17	−0.09	+0.06	25.67	17 37 39.46	13.79	0.08
	μ Herculis	.	7	9 5 38.26	−0.61	−0.06	−0.04	−0.10	+0.07	37.52	17 41 51.56	14.04	0.17
	ψ¹ Draconis	.	1	9 7 53.42	−1.36	−0.12	+0.75	−0.30	+0.07	52.46	17 44 6.14	[13.68]	. .
	35 Draconis	W.	7	9 18 37.01	−1.72	−0.20	+1.11	−0.40	+0.09	35.89	17 54 49.43	[13.54]	. .

$a' = -0^s.214$ (circle E.); $a'' = -0^s.360$ (circle W.); $c = 0^s.073$ (+ with circle E.).

Chronometer No. 1254, at $8^h\,23^m$ chron. time, $8^h\,36^m\,13^s.87 \pm 0^s.023$ slow, losing $0^s.092$ per hour.

$10^h\,33^m$ $8^h\,36^m\,14^s.07$

Transits of stars observed at Shanghai, China, by Lieut. Commander F. M Green, U. S. N., to determine the correction of sidereal chronometer Negus 1295.

Date.	Name of Star.	Circle.	No. of threads.	Transit over mean of threads.	Flexure.	Level.	Azimuth.	Aberration and collimation.	Rate.	Seconds of corr. transit.	R. A.	Chron. correction.	v.
1881.				h. m. s.	s.	s.	s.	s.	s.	s.	h. m. s.	h. m. s.	s.
July 26	η Pegasi	E.	7	14 32 0.81	+0.63	+0.25	+ 0.34	+ 1.87	—0.01	3.89	22 37 29.20	+8 5 25.31	0.05
	λ Pegasi	.	7	14 35 22.45	+0.59	+0.23	+ 1.61	+ 1.77	—0.01	26.64	22 40 51.86	25.22	0.03
	μ Pegasi	.	7	14 38 50.14	+0.60	+0.24	+ 1.42	+ 1.78	—0.01	54.17	22 44 19.49	25.32	0.06
	ι Cephei	.	7	14 40 14.26	+1.10	+0.44	—14.11	+ 3.94	—0.01	5.62	22 45 31.48	[25.86]	. .
	β Pegasi	.	7	14 52 35.56	+0.62	+0.12	+ 0.78	+ 1.84	0.00	38.92	22 58 4.24	25.32	0.06
	α Pegasi	.	5	14 53 23.17	+0.54	+0.09	+ 3.06	+ 1.68	0.00	28.54	22 58 53.84	25.30	0.04
	π Cephei	E.	7	14 59 6.72	+1.52	+0.19	—27.07	+ 6.20	0.00	47.56	23 4 12.88	+8 5 [25.32]	. .
	γ Piscium	W.	7	15 5 35.12	—0.48	+0.05	+ 5.03	— 1.59	0.00	38.13	23 11 3.55	+8 5 25.42	0.16
	o Cephei	.	7	15 8 45.96	—1.16	+0.15	—16.19	— 4.15	0.00	24.61	23 13 49.68	[25.07]	. .
	ν Pegasi	.	7	15 14 5.65	—0.59	+0.08	+ 1.68	— 1.72	0.00	5.10	23 19 30.21	25.11	0.15
	θ Piscium	.	4	15 16 32.08	—0.50	+0.07	+ 4.55	— 1.60	+0.01	34.61	23 21 59.82	25.21	0.05
	70 Pegasi	W.	6	15 17 45.33	—0.53	+0.09	+ 3.52	— 1.63	+0.01	46.79	23 23 11.93	25.14	0.12

$a' = +10^s.34$ (circle E.); $a'' = +10^s.50$ (circle W.); $c = 1^s.61$ (+ with circle E.).

Chronometer No. 1295, at $15^h\ 0^m$ chron. time, $8^h\ 5^m\ 25^s.26 \pm 0^s.022$ slow, losing $0^s.02$ per hour.

$11^h\ 7^m$ $8^h\ 5^m\ 25^s.18$

July 27	γ Herculis	W.	7	8 11 20.54	—0.57	—0.19	— 0.44	— 1.73	—0.02	17.59	16 16 43.40	+8 5 25.81	0.05
	ω Herculis	.	7	8 14 35.92	—0.54	—0.20	— 0.61	— 1.68	—0.02	32.87	16 19 58.71	25.84	0.02
	η Ursæ Minoris	.	5	8 15 38.41	—1.62	—0.65	+ 6.03	— 6.75	—0.02	35.39	16 21 0.91	[25.52]	. .
	λ Ophiuchi	.	7	8 19 35.77	—0.48	—0.21	— 0.98	— 1.63	—0.02	32.45	16 24 58.26	25.81	0.05
	A Draconis	.	7	8 22 52.23	—1.21	—0.55	+ 3.48	— 4.56	—0.02	49.37	16 28 15.23	[25.86]	. .
	ζ Herculis	W.	7	8 31 27.97	—0.65	—0.25	+ 0.24	— 1.92	—0.01	25.38	16 36 51.07	+8 5 25.69	0.17
	ϵ Ursæ Minoris	E.	7	8 52 51.95	+2.56	+0.75	—20.19	+12.36	—0.01	47.42	16 58 13.10	+8 5 [25.68]	. .
	α Herculis	.	7	9 3 47.49	+0.54	+0.16	+ 1.04	+ 1.72	0.00	50.85	17 9 16.80	25.95	0.09
	ϑ Herculis	.	7	9 4 42.96	+0.60	+0.18	+ 0.42	+ 1.84	0.00	46.00	17 10 11.95	25.95	0.09
	α Ophiuchi	.	7	9 23 58.93	+0.48	+0.16	+ 1.15	+ 1.71	0.00	2.43	17 29 28.27	25.84	0.02
	μ Herculis	.	7	9 36 22.65	+0.62	+0.18	+ 0.24	+ 1.89	0.00	25.58	17 41 51.50	24.92	0.06
	ξ Herculis	.	7	9 47 43.08	+0.63	+0.15	+ 0.14	+ 1.91	+0.01	45.92	17 53 11.87	25.95	0.09
	109 Herculis	E.	7	10 13 12.16	+0.58	+0.20	+ 0.62	+ 1.80	+0.02	15.38	18 18 41.27	+8 5 25.89	0.03

$a' = -2^s.03$ (circle W.); $a'' = +3^s.51$ (circle E.); $c = 1^s.65$ (+ with circle E.).

Chronometer No. 1295, at $9^h\ 12^m$ chron. time, $8^h\ 5^m\ 25^s.86 \pm 0^s.018$ slow, losing $0^s.02$ per hour.

$10^h\ 47^m$ $8^h\ 5^m\ 25^s.89$

Transits of stars observed at Nagasaki, Japan, by Lieut. Commander C. H. Davis, U. S. N., to determine the correction of sidereal chronometer Negus 1254.

Date.	Name of Star.	Circle.	No. of threads.	Transit over mean of threads.	Flexure.	Level.	Azimuth.	Aberration and collimation.	Rate.	Seconds of corr. transit.	R. A.	Chron. correction.	v.
1881.				h. m. s.	s.	s.	s.	s.	s.	s.	h. m. s.	h. m. s.	s.
July 26	η Herculis	W.	7	8 2 28.14	—0.69	—0.20	— 0.20	—0.41	—0.06	26.58	16 38 51.89	+8 36 25.31	0.05
	49 Herculis	.	7	8 10 18.50	—0.53	—0.14	+ 0.45	—0.33	—0.05	17.90	16 46 43.22	25.32	0.04
	κ Ophiuchi	.	7	8 15 40.78	—0.50	—0.15	+ 0.57	—0.32	—0.04	40.34	16 52 5.68	25.34	0.02
	ε Herculis	.	7	8 19 23.10	—0.63	—0.21	+ 0.05	—0.37	—0.04	21.90	16 55 47.36	25.46	0.10
	ε Ursæ Minoris	.	7	8 22 2.11	—2.60	—0.91	— 8.00	—2.34	—0.03	48.23	16 58 13.25	[25.02]	. .
	ζ Draconis	.	7	8 32 7.78	—1.11	—0.39	— 1.90	—0.77	—0.02	3.59	17 8 29.08	[25.49]	. .
	δ Herculis	.	7	8 33 47.49	—0.59	—0.11	+ 0.21	—0.35	—0.01	46.63	17 10 11.96	25.33	0.03
	π Herculis	W.	6	8 34 33.30	—0.67	—0.24	— 0.13	—0.40	—0.01	31.85	17 10 57.27	25.42	0.06
	α Ophiuchi	E.	7	8 53 1.86	+0.52	—0.30	+ 0.56	+0.29	+0.02	2.95	17 29 28.28	25.33	0.03
	ω Draconis	.	7	9 1 17.43	+1.21	—0.70	— 2.60	+0.77	+0.03	16.14	17 37 41.57	[25.43]	. .
	μ Herculis	.	7	9 5 25.25	+0.61	—0.36	+ 0.16	+0.32	+0.03	26.01	17 41 51.51	25.50	0.14
	ψ^1 Draconis	.	7	9 7 42.33	+1.36	—0.80	— 3.32	+0.92	+0.04	40.53	17 44 5.92	[25.39]	. .
	θ Herculis	.	7	9 15 47.71	+0.68	—0.40	— 0.16	+0.35	+0.05	48.23	17 52 13.59	25.36	0.00
	ξ Herculis	.	7	9 16 45.91	+0.62	—0.36	+ 0.11	+0.32	+0.05	46.65	17 53 11.88	25.23	0.13
	35 Draconis	.	6	9 18 26.79	+1.72	—1.00	— 4.94	+1.24	+0.05	23.86	17 54 49.12	[25.26]	. .
	o Herculis	E.	7	9 26 31.35	+0.62	—0.36	+ 0.13	+0.32	+0.07	32.13	18 2 57.53	25.40	0.04

$a' = +1^s.425$ (circle W.); $a'' = +1^s.596$ (circle E.); $c = 0^s.298$ (+ with circle E.).
Chronometer No. 1254, at $8^h\ 43^m$ chron. time, $8^h\ 36^m\ 25^s.36 \pm 0^s.015$ slow, losing $0^s.092$ per hour.
$11^h\ 10^m$ $8^h\ 36^m\ 25^s.59$

July 27	ζ Draconis	E.	7	8 32 0.51	+1.11	+0.06	— 1.43	+0.81	—0.08	0.88	17 8 29.05	+8 36 [28.17]	. .
	π Herculis	.	7	8 34 28.55	+0.67	+0.08	— 0.10	+0.41	—0.08	29.53	17 10 57.26	27.73	0.08
	α Ophiuchi	.	7	8 52 59.57	+0.52	+0.09	+ 0.38	+0.34	—0.05	0.85	17 29 28.27	27.42	0.23
	ω Draconis	.	7	9 1 12.79	+1.21	+0.10	— 1.75	+0.92	—0.04	13.23	17 37 41.53	[28.30]	. .
	μ Herculis	.	7	9 5 22.74	+0.61	+0.04	+ 0.11	+0.37	—0.03	23.84	17 41 51.50	27.66	0.01
	ψ^1 Draconis	.	7	9 7 37.53	+1.36	+0.08	— 2.23	+1.08	—0.03	37.79	17 44 5.87	[28.08]	. .
	θ Herculis	.	7	9 15 44.97	+0.68	+0.14	— 0.11	+0.42	—0.02	46.08	17 52 13.58	27.50	0.15
	ξ Herculis	E.	7	9 16 43.20	+0.62	+0.14	+ 0.08	+0.38	—0.01	44.41	17 53 11.87	27.46	0.19
	72 Ophiuchi	W.	7	9 25 18.06	—0.50	+0.09	+ 1.32	—0.37	0.00	18.60	18 1 46.24	27.64	0.01
	o Herculis	.	7	9 26 30.34	—0.62	+0.10	+ 0.26	—0.42	0.00	29.66	18 2 57.52	27.86	0.21
	δ Ursæ Minoris	.	7	9 35 18.51	—5.39	+0.63	—45.35	—6.21	+0.01	22.20	18 10 44.31	[22.11]	. .
	χ Draconis	.	7	9 46 57.16	—1.39	+0.16	— 7.15	—1.23	+0.03	47.58	18 23 15.07	[27.49]	. .
	110 Herculis	.	7	10 4 8.61	—0.56	0.00	+ 0.75	—0.39	+0.06	8.47	18 40 36 15	27.68	0.03
	β Lyræ	.	7	10 9 17.99	—0.64	—0.04	— 0.03	—0.44	+0.07	16.91	18 45 44.77	27.86	0.21
	θ Serpentis	.	7	10 13 53.70	—0.48	—0.01	+ 1.60	—0.37	+0.07	54.51	18 50 22.23	27.72	0.07
	ν Draconis	W.	7	10 19 34.68	—1.31	—0.04	— 6.37	—1.14	+0.08	25.90	18 55 54.44	[28.54]	. .

$a' = +1^s.073$ (circle E.); $a'' = +3^s.317$ (circle W.); $c = 0^s.349$ (+ with circle E.).
Chronometer No. 1254, at $9^h\ 26^m$ chron. time, $8^h\ 36^m\ 27^s.65 \pm 0^s.034$ slow, losing $0^s.091$ per hour.
$10^h\ 50^m$ $8^h\ 36^m\ 27^s.78$

Transits of stars observed at Amoy, China, by Lieut. John A. Norris, U. S. N., to determine the correction of sidereal chronometer Negus 1519.

Date.	Name of Star.	Circle.	No. of threads.	Transit over mean of threads.	Flexure.	Level.	Azimuth.	Aberration and collimation.	Rate.	Seconds of corr. transit.	R. A.	Chron. correction.	*v.*
1881.				*h.* *m.* *s.*	*s.*	*s.*	*s.*	*s.*	*s.*	*s.*	*h.* *m.* *s.*	*h.* *m.* *s.*	*s.*
Sept. 10	ε Delphini	W.	7	12 36 45.02	—0.27	—0.08	+0.11	—0.01	—0.03	44.74	20 27 35.64	+7 50 50.90	0.10
	Groom. 3241 . . .	.	7	12 39 44.87	—0.60	+0.02	—1.10	—0.03	—0.03	43.13	20 30 33.83	[50.70]	. .
	73 Draconis	.	7	12 42 18.13	—0.66	+0.09	—1.31	—0.04	—0.03	16.18	20 33 7.00	[50.82]	. .
	δ Delphini	.	7	12 47 7.56	—0.28	+0.06	+0.08	—0.01	—0.02	7.39	20 37 58.14	50.75	0.05
	ν Delphini (seq.) .	.	7	12 50 21.59	—0.28	+0.06	+0.07	—0.01	—0.02	21.41	20 41 12.21	50.80	0.00
	32 Vulpeculæ	.	7	12 58 42.77	—0.31	+0.08	—0.03	—0.01	—0.02	42.48	20 49 33.20	50.72	0.08
	T. Y. C. 1879. . .	.	7	13 2 12.33	—0.90	+0.25	—2.19	—0.06	—0.02	9.41	20 53 0.51	[51.10]	. .
	ζ Cygni	.	7	13 17 5.74	—0.32	+0.11	—0.04	—0.01	—0.01	5.47	21 7 56.24	50.77	0.03
	α Equulei	.	7	13 19 5.93	—0.26	+0.09	+0.15	—0.01	—0.01	5.89	21 9 56.70	50.81	0.01
	1 Pegasi	W.	7	13 25 48.50	—0.29	+0.11	+0.04	—0.01	0.00	48.35	21 16 39.05	50.70	0.10
	ε Pegasi	E.	7	13 47 33.31	+0.27	+0.28	+0.09	—0.03	+0.01	33.93	21 38 24.74	50.81	0.01
	11 Cephei	.	7	13 49 24.30	+0.58	+0.57	—0.79	—0.09	+0.01	24.58	21 40 15.30	[50.72]	. .
	16 Pegasi	.	7	13 56 51.60	+0.30	+0.26	—0.01	—0.03	+0.02	52.14	21 47 43.06	50.92	0.12
	α Aquarii	.	7	14 8 53.30	+0.25	+0.21	+0.15	—0.03	+0.02	53.90	21 59 44.68	50.78	0.02
	ι Pegasi	.	7	14 10 41.12	+0.30	+0.26	+0.00	—0.03	+0.02	41.67	22 1 32.56	50.89	0.09
	θ Pegasi	.	7	14 13 24.83	+0.26	+0.23	+0.12	—0.03	+0.02	25.43	22 4 16.17	50.74	0.06
	24 Cephei	E.	7	14 16 45.40	+0.60	+0.54	—0.84	—0.09	+0.03	45.64	22 7 36.45	[50.81]	. .

$a' = +0^s.456$ (circle W.); $a'' = +0^s.359$ (circle E.); $c = 0^s.009$ (— with circle E.).

Chronometer No. 1519, at $13^h\ 30^m$ chron. time, $7^h\ 50^m\ 50^s.80 \pm 0^s.014$ slow, losing $0^s.034$ per hour.

$16^h\ 0^m$ $7^h\ 50^m\ 50^s.88$

Sept. 11	α Ophiuchi.	E.	7	9 38 35.31	+0.28	+0.08	+0.09	+0.03	—0.10	35.69	17 29 27.62	+7 50 51.93	0.15
	f Draconis	.	7	9 41 34.69	+0.54	+0.41	—0.84	+0.08	—0.10	34.78	17 32 26.48	[51.70]	. .
	β Ophiuchi.	.	7	9 46 46.54	+0.26	+0.22	+0.15	+0.03	—0.09	47.11	17 37 38.84	51.73	0.05
	μ Herculis	.	7	9 50 58.47	+0.31	+0.26	—0.03	+0.03	—0.09	58.95	17 41 50.74	51.79	0.01
	ψ^1 Draconis	.	7	9 53 11.04	+0.60	+0.51	—1.10	+0.09	—0.09	11.05	17 44 2.84	[51.79]	. .
	ξ Herculis	.	7	10 2 18.87	+0.31	+0.22	+0.04	+0.03	—0.08	19.39	17 53 11.13	51.74	0.04
	72 Ophiuchi.	.	7	10 10 53.46	+0.27	+0.13	+0.12	+0.03	—0.07	53.94	18 1 45.69	51.75	0.03
	36 Draconis	.	7	10 22 21.91	+0.49	+0.23	—0.67	+0.06	—0.06	21.97	18 13 13.78	[51.81]	. .
	109 Herculis	.	7	10 27 48.43	+0.30	+0.15	+0.02	+0.03	—0.06	48.87	18 18 40.66	51.79	0.01
	χ Draconis	E.	7	10 32 20.54	+0.62	+0.34	—1.13	+0.09	—0.05	20.41	18 23 12.25	[51.84]	. .
	110 Herculis	W.	7	10 49 44.49	—0.29	—0.18	+0.03	—0.07	—0.04	43.94	18 40 35.62	51.68	0.10
	50 Draconis	.	7	10 59 23.25	—0.68	—0.51	—1.09	—0.26	—0.03	20.71	18 50 12.42	[51.71]	. .
	Groom. 3241 . . .	.	7	12 39 44.16	—0.60	—0.62	—0.96	—0.22	+0.06	41.82	20 30 33.78	[51.96]	. .
	α Delphini	.	7	12 43 19.23	—0.28	—0.25	+0.06	—0.07	+0.07	18.76	20 34 10.55	51.79	0.01
	δ Delphini	.	7	12 47 6.84	—0.28	—0.24	+0.06	—0.07	+0.07	6.38	20 37 58.13	51.75	0.03
	γ Delphini (seq.) .	.	7	12 50 20.77	—0.28	—0.24	+0.06	—0.07	+0.07	20.31	20 41 12.20	51.89	0.11
	β Pegasi	.	7	15 7 13.50	—0.31	—0.25	—0.02	—0.07	+0.20	13.05	22 58 4.86	51.81	0.03
	α Pegasi	W.	7	15 8 3.01	—0.28	—0.22	+0.06	—0.07	+0.20	2.71	22 58 54.45	51.74	0.04

$a' = +0^s.452$ (circle E.); $a'' = +0^s.357$ (circle W.); $c = 0^s.047$ (+ with circle E.).

Chronometer No. 1519, at $11^h\ 30^m$ chron. time, $7^h\ 50^m\ 51^s.78 \pm 0^s.014$ slow, losing $0^s.054$ per hour.

$14^h\ 17^m$ $7^h\ 50^m\ 51^s.93$

Transits of stars observed at Shanghai, China, by Lieut. Commander C. H. Davis, U. S. N., to determine the correction of sidereal chronometer Negus 1254.

Date.	Name of Star.	Circle.	No. of threads.	Transit over mean of threads.	Flexure.	Level.	Azimuth.	Aberration and collimation.	Rate.	Seconds of corr. transit.	R. A.	Chron. correction.	*v.*
1881.				*h.* *m.* *s.*	*s.*	*s.*	*s.*	*s.*	*s.*	*s.*	*h.* *m.* *s.*	*h.* *m.* *s.*	*s.*
Sept. 10	73 Draconis	E.	7	12 28 42.61	+1.48	+0.08	— 5.10	—0.31	—0.11	38.65	20 33 7.00	+8 4 [28.35]	. .
	76 Draconis	.	7	12 46 53.50	+2.48	+0.43	—11.18	—0.60	—0.08	44.55	20 51 10.86	[26.31]	. .
	δ^3 Ursæ Maj. S. P. .	.	7	12 55 23.02	—0.22	—0.04	+ 5.14	+0.12	—0.06	27.96	8 59 56.78	[28.82]	. .
	61^1 Cygni	.	7	12 57 8.98	+0.68	+0.16	— 0.31	—0.11	—0.06	9.34	21 1 37.91	28.57	0.07
	ζ Cygni	.	7	13 3 27.06	+0.62	+0.11	+ 0.06	—0.10	—0.05	27.70	21 7 56.24	28.54	0.10
	α Equulei	.	7	13 5 26.71	+0.48	+0.08	+ 0.89	—0.08	—0.04	28.04	21 9 56.70	28.66	0.02
	1 Pegasi	.	7	13 12 9.31	+0.57	+0.10	+ 0.43	—0.09	—0.03	10.29	21 16 39.05	28.76	0.12
	λ Ursæ Maj. S. P. .	.	7	13 17 37.01	—0.10	—0.02	+ 4.44	+0.11	—0.02	41.44	9 22 10.15	[28.71]	. .
	β Aquarii	E.	7	13 20 51.63	+0.43	+0.08	+ 1.28	—0.08	—0.02	53.32	21 25 22.03	28.71	0.07
	ε Pegasi	W.	7	13 33 55.85	—0.51	+0.15	+ 0.68	+0.05	+0.01	56.23	21 38 24.74	28.51	0.13
	16 Pegasi	.	7	13 43 14.69	—0.60	+0.15	+ 0.20	+0.05	+0.03	14.52	21 47 43.06	28.54	0.10
	79 Draconis	.	7	13 47 5.19	—1.39	+0.32	— 4.14	+0.16	+0.03	0.17	21 51 28.29	[28.12]	. .
	α Aquarii	.	7	13 55 15.26	—0.46	+0.10	+ 0.96	+0.05	+0.05	15.96	21 59 44.68	28.72	0.08
	20 Cephei	.	7	13 57 1.82	—0.99	+0.21	— 1.98	+0.10	+0.05	59.21	22 1 28.17	[28.96]	. .
	27(π^1) Pegasi	.	7	13 59 33.35	—0.64	+0.14	— 0.05	+0.06	+0.06	32.92	22 4 1.57	28.65	0.01
	π Pegasi	.	7	14 0 18.16	—0.64	+0.13	— 0.05	+0.06	+0.06	17.72	22 4 46.45	28.73	0.09
	24 Cephei	W.	7	14 3 12.50	—1.31	+0.03	— 3.73	+0.15	+0.06	7.70	22 7 36.45	[28.75]	. .

$a' = +1^s.981$ (circle E.); $a'' = +1^s.798$ (circle W.); $c = 0^s.065$ (— with circle E.).

Chronometer No. 1254, at $13^h\ 29^m$ chron. time, $8^h\ 4^m\ 28^s.64 \pm 0^s.020$ slow, losing $0^s.113$ per hour.

$16^h\ 0^m$ $8^h\ 4^m\ 28^s.92$

Sept. 11	ε Delphini	W.	7	12 23 4.23	—0.52	+0.09	+ 0.72	—0.12	—0.12	4.28	20 27 35.64	+8 4 31.36	0.15
	73 Draconis	.	7	12 28 42.94	—1.48	+0.34	— 5.26	—0.45	—0.11	35.98	20 33 6.94	[30.96]	. .
	ε Cygni	.	7	12 36 57.07	—0.65	+0.15	— 0.10	—0.14	—0.10	56.23	20 41 27.56	31.33	0.12
	76 Draconis	.	7	12 46 53.84	—2.48	+0.43	—11.51	—0.87	—0.08	39.33	20 51 10.76	[31.43]	. .
	61^1 Cygni	.	7	12 57 7.66	—0.68	+0.14	— 0.31	—0.15	—0.06	6.60	21 1 37.90	31.30	0.09
	ζ Cygni	.	7	13 3 25.68	—0.62	+0.14	+ 0.06	—0.14	—0.05	25.07	21 7 56.23	31.16	0.05
	α Equulei	W.	7	13 5 25.27	—0.48	+0.11	+ 0.91	—0.12	—0.05	25.64	21 9 56.69	31.05	0.16
	α Cephei	E.	7	13 11 17.64	+0.99	—0.03	— 2.19	+0.18	—0.04	16.55	21 15 48.34	[31.79]	. .
	d Ursæ Maj. S. P. .	.	7	13 19 21.38	—0.32	+0.00	+ 5.82	—0.35	—0.02	26.51	9 23 58.04	[31.53]	. .
	β Aquarii	.	7	13 20 48.97	+0.43	—0.00	+ 1.22	+0.08	—0.02	50.68	21 25 22.03	31.35	0.14
	β Cephei (pr.) . . .	.	7	13 22 42.16	+1.58	.00	— 3.67	+0.24	—0.02	40.29	21 27 11.58	[31.29]	. .
	10 Lacertæ	.	7	14 29 28.06	+0.68	+0.08	— 0.32	+0.11	+0.09	28.72	22 33 59.82	31.10	0.11
	η Pegasi	.	7	14 32 57.78	+0.62	+0.06	+ 0.07	+0.10	+0.10	58.73	22 37 29.92	31.19	0.02
	λ Pegasi	.	7	14 36 20.16	+0.58	+0.04	+ 0.31	+0.09	+0.10	21.28	22 40 52.39	31.11	0.10
	μ Pegasi	E.	7	14 39 47.79	+0.59	+0.03	+ 0.28	+0.09	+0.11	48.89	22 44 20.04	31.15	0.06

$a' = +2^s.040$ (circle W.); $a'' = +1^s.988$ (circle E.); $c = 0^s.101$ (+ with circle E.).

Chronometer No. 1254, at $13^h\ 34^m$ chron. time, $8^h\ 4^m\ 31^s.21 \pm 0^s.024$ slow, losing $0^s.100$ per hour.

$14^h\ 0^m$ $8^h\ 4^m\ 31^s.25$

Transits of stars observed at Hong-Kong, China, by Lieut. Commander F. M. Green, U. S. N., to determine the correction of sidereal chronometer Negus 1295.

Date.	Name of Star.	Circle.	No. of threads.	Transit over mean of threads.	Flexure.	Level.	Azimuth.	Aberration and collimation.	Rate.	Seconds of corr. transit.	R. A.	Chron. correction.	*v.*
1881.				*h. m. s.*	*s.*	*s.*	*s.*	*s.*	*s.*	*s.*	*h. m. s.*	*h. m. s.*	*s.*
Sept. 10	κ Cephei	E.	7	12 36 25.55	+1.44	−0.50	− 8.66	−4.57	−0.03	13.23	20 12 54.72	+7 36 [41.49]	. .
	γ Cygni	.	6	12 41 21.14	+0.86	−0.27	− 0.91	−1.30	−0.02	19.50	20 18 1.05	41.55	0.05
	ε Delphini	.	5	12 50 54.42	+0.55	−0.16	+ 0.46	−1.02	−0.02	54.23	20 27 35.65	41.42	0.08
	β Delphini	.	7	12 55 20.84	+0.56	−0.15	+ 0.33	−1.03	−0.02	20.53	20 32 2.05	41.52	0.02
	α Delphini	.	7	12 57 29.52	+0.57	−0.14	+ 0.28	−1.04	−0.02	29.17	20 34 10.56	41.39	0.11
	ϑ Delphini	.	7	13 1 17.06	+0.56	−0.13	+ 0.32	−1.03	−0.02	16.76	20 37 58.14	41.38	0.12
	ε Cygni	E.	7	13 4 47.32	+0.64	−0.15	− 0.54	−1.20	−0.02	46.05	20 41 27.57	+7 36 41.52	0.02
	61 Cygni	W.	7	13 24 57.59	−0.67	−0.23	− 1.63	+1.31	−0.01	56.36	21 1 37.91	+7 36 41.55	0.05
	ζ Cygni	.	7	13 31 15.04	−0.63	−0.22	− 0.70	+1.19	−0.01	14.79	21 7 56.24	41.45	0.05
	11 Cephei	.	7	14 3 42.84	−1.11	−0.38	−10.67	+3.13	+0.01	33.82	21 40 15.30	[41.48]	. .
	η Pegasi	.	7	15 0 48.28	−0.63	−0.22	− 0.69	+1.50	+0.02	48.26	22 37 29.91	41.65	0.15
	λ Pegasi	.	7	15 4 10.32	−0.60	−0.21	− 0.06	+1.41	+0.02	10.84	22 40 52.39	41.55	0.05
	ι Cephei	W.	7	15 8 56.78	−0.97	−0.23	− 7.79	+3.14	+0.02	50.93	22 45 32.29	7 36 [41.36]	. .

$a' = +2^s.31$ (circle E.); $a'' = +4^s.69$ (circle W.); $c =$ $1^s.01$ (— for circle E to η Pegasi).
then $1^s.28$

Chronometer No. 1295, at $13^h\ 52^m$ chron. time, $7^h\ 36^m\ 41^s.50 \pm 0^s.018$ slow, losing $0^s.018$ per hour.
$16^h\ 0^m$ $7^h\ 36^m\ 41^s.56$

Sept. 11	ε Draconis	E.	7	12 11 59.06	+1.08	+0.26	− 4.06	−2.86	−0.02	53.46	19 48 36.35	+7 36 [41.89]	. .
	θ Aquilæ.	.	7	12 28 31.86	+0.50	0.00	+ 0.75	−0.98	−0.01	32.12	20 5 13.91	41.79	0.11
	κ Cephei (pre.) . .	.	7	12 36 23.16	+1.44	−0.16	− 7.04	−4.48	−0.01	12.91	20 12 54.64	[41.73]	. .
	γ Cygni	.	7	12 41 20.38	+0.86	−0.20	− 0.75	−1.28	−0.01	19.00	20 18 1.03	42.03	0.13
	ε Delphini	.	7	12 50 53.87	+0.55	−0.13	+ 0.38	−1.00	0.00	53.67	20 27 35.63	41.96	0.06
	β Delphini	E.	7	12 55 20.48	+0.56	−0.13	+ 0.27	−1.01	0.00	20.17	20 32 2.04	+7 36 41.87	0.03
	μ Aquarii	W.	7	13 9 35.03	−0.47	−0.14	+ 1.11	+1.03	0.00	36.56	20 46 18.45	+7 36 41.89	0.01
	76 Draconis	.	7	13 14 37.66	−2.01	−0.58	−13.15	+7.42	0.00	29.34	20 51 10.76	[41.42]	. .
	61¹ Cygni	.	7	13 24 56.18	−0.67	−0.21	− 0.73	+1.30	+0.01	55.88	21 1 37.89	42.01	0.11
	77 Draconis	.	7	13 31 18.48	−1.46	−0.45	− 8.04	+4.77	+0.01	13.31	21 7 55.54	[42.23]	. .
	α Equulei	.	6	13 33 13.84	−0.58	−0.17	+ 0.63	+1.02	+0.01	14.80	21 9 56.69	41.89	0.01
	ι Pegasi	.	7	13 39 56.90	−0.58	−0.20	+ 0.11	+1.08	+0.01	57.32	21 16 39.05	41.73	0.17
	β Aquarii	W.	7	13 48 38.67	−0.49	−0.17	+ 1.00	+1.03	+0.02	40.06	21 25 22.03	+7 36 41.97	0.07

$a' = +1^s.88$ (circle E.); $a'' = +2^s.09$ (circle W.); $c = 1^s.00$ (— with circle E.).
Chronometer No. 1295 at $13^h\ 0^m$ chron. time, $7^h\ 36^m\ 41^s.90 \pm 0^s.021$ slow, losing $0^s.017$ per hour.
$14^h\ 34^m$ $7^h\ 36^m\ 41^s.93$

Transits of stars observed at Amoy, China, by Lieut. John A. Norris, U. S. N., to determine the correction of sidereal chronometer Negus 1519.

Date.	Name of Star.	Circle.	No. of threads.	Transit over mean of threads.	Flexure.	Level.	Azimuth.	Aberration and collimation.	Rate.	Seconds of corr. transit.	R. A.	Chron. correction.	*v.*
1881.				*h.* *m.* *s.*	*s.*	*s.*	*s.*	*s.*	*s.*	*s.*	*h.* *m.* *s.*	*h.* *m.* *s.*	*s.*
Sept. 12	α Ophiuchi	W.	7	9 38 34.85	−0.28	−0.08	+0.10	−0.08	−0.10	34.41	17 29 27.61	+7 50 53.20	0.06
	β Ophiuchi	.	7	9 46 46.02	−0.26	−0.10	+0.16	−0.08	−0.09	45.65	17 37 38.82	53.17	0.09
	μ Herculis	.	7	9 50 58.06	−0.31	−0.13	−0.03	−0.09	−0.08	57.42	17 41 50.72	53.30	0.04
	ψ^1 Draconis	.	7	9 53 11.86	−0.60	−0.28	−1.13	−0.25	−0.08	9.52	17 44 3.24	[53.72]	. .
	ξ Herculis	.	7	10 2 18.60	−0.31	−0.17	−0.04	−0.09	−0.07	17.92	17 53 11.11	53.19	0.07
	35 Draconis	.	7	10 3 54.29	−0.74	−0.41	−1.65	−0.34	−0.06	44.81	17 54 44.81	[53.72]	. .
	72 Ophiuchi	.	7	10 10 52.94	−0.27	−0.16	+0.12	−0.08	−0.06	52.49	18 1 45.68	53.19	0.07
	o Herculis	.	7	10 12 4.20	−0.31	−0.18	−0.04	−0.09	−0.06	3.52	18 2 56.76	53.24	0.02
	δ Ursæ Minoris	.	7	10 19 44.23	−2.18	−1.26	−6.99	−1.30	−0.05	32.45	18 10 27.76	[55.31]	. .
	109 Herculis	W.	7	10 27 47.98	−0.30	−0.14	+0.02	−0.08	−0.04	47.44	18 18 40.64	53.20	0.06
	110 Herculis	E.	7	10 49 41.93	+0.29	−0.02	+0.03	+0.04	−0.01	42.26	18 40 35.60	53.34	0.08
	24 H. Camelop. S. P.	.	7	10 51 53.31	−0.25	+0.01	+1.90	−0.35	−0.01	54.61	6 42 48.37	[53.76]	. .
	θ Serpentis (pr.)	.	7	10 59 28.03	+0.26	+0.01	+0.15	+0.04	0.00	28.49	18 50 21.81	53.32	0.06
	ε Aquilæ	.	7	11 3 22.90	+0.28	+0.03	+0.07	+0.04	0.00	23.32	18 54 16.68	53.36	0.10
	ν Draconis	.	7	11 4 59.25	+0.58	+0.08	−0.98	+0.12	+0.01	59.06	18 55 52.09	[53.03]	. .
	ζ Aquilæ	.	7	11 9 6.14	+0.28	+0.07	+0.08	+0.04	+0.01	6.62	18 59 59.88	53.26	0.00
	β Cephei (pr.)	.	7	13 36 18.74	+0.56	+0.01	−0.91	+0.11	+0.18	18.69	21 37 11.56	[52.87]	. .
	ε Pegasi	.	7	13 47 30.77	+0.27	0.00	+0.11	+0.04	+0.20	31.39	21 38 24.73	53.34	0.08
	κ Pegasi	.	7	13 48 25.59	+0.30	0.00	−0.01	+0.04	+0.20	26.12	21 39 19.52	53.40	0.14
	16 Pegasi	E.	7	13 56 49.32	+0.30	0.00	−0.01	+0.04	+0.21	49.86	21 47 43.05	53.19	0.07

$a' = +0^s.467$ (circle W.); $a'' = +0^s.433$ (circle E.); $c = 0^s.058$ (+ with circle E.).
Chronometer No. 1519, at $11^h\ 0^m$ chron. time, $7^h\ 50^m\ 53^s.26 \pm 0^s.014$ slow, losing $0^s.070$ per hour.
$15^h\ 15^m$ $7^h\ 50^m\ 53^s.56$

Sept. 16	μ Herculis	E.	7	9 50 48.58	+0.31	+0.14	−0.04	+0.08	−0.08	48.99	17 41 50.63	+7 51 1.64	0.03
	ψ^1 Draconis	.	7	9 53 1.47	+0.60	+0.14	−1.37	+0.22	−0.08	0.98	17 44 2.45	[1.47]	. .
	ξ Herculis	.	7	10 2 9.05	+0.31	0.00	−0.05	+0.08	−0.07	9.32	17 53 11.02	1.70	0.09
	35 Draconis	.	7	10 3 43.84	+0.74	0.00	−2.00	+0.30	−0.06	42.82	17 54 44.39	[1.57]	. .
	o Herculis	.	7	10 11 54.70	+0.31	−0.02	−0.05	+0.08	−0.05	54.97	18 2 56.68	1.71	0.10
	δ Ursæ Minoris	.	7	10 19 29.36	+2.18	−0.09	−8.47	+1.13	−0.04	24.07	18 10 26.02	[1.95]	. .
	η Serpentis	.	7	10 24 10.55	+0.24	0.00	+0.26	+0.07	−0.03	11.09	18 15 12.64	1.55	0.06
	109 Herculis	E.	7	10 27 38.61	+0.30	+0.10	+0.03	+0.07	−0.03	39.08	18 18 40.57	1.49	0.12
	110 Herculis	W.	7	10 49 34.58	−0.29	−0.28	+0.05	−0.11	+0.01	33.96	18 40 35.53	1.57	0.04
	24 H. Camelop. S. P.	.	7	10 51 44.59	+0.25	+0.21	+2.66	+0.30	+0.01	48.02	6 42 48.83	[0.81]	. .
	θ Serpentis (pr.)	.	7	10 59 20.53	−0.26	−0.18	+0.21	−0.11	+0.02	20.21	18 50 21.74	1.53	0.08
	ε Aquilæ	.	7	11 3 15.51	−0.28	−0.19	+0.10	−0.11	+0.03	15.06	18 54 16.61	1.55	0.06
	ν Draconis	.	7	11 4 52.57	−0.58	−0.40	−1.36	−0.32	+0.03	49.94	18 55 51.82	[1.88]	. .
	ζ Aquilæ	.	7	11 8 58.64	−0.28	−0.18	+0.12	−0.11	+0.04	58.23	18 59 59.82	1.59	0.02
	25 Camelop. S. P.	.	7	11 15 0.39	+0.63	+0.42	+4.50	+0.52	+0.05	6.51	7 6 7.16	[0.65]	. .
	ω Aquilæ	.	7	11 21 16.07	−0.27	−0.20	+0.14	−0.11	+0.06	15.69	19 12 17.33	1.64	0.03
	δ Aquilæ	W.	7	11 28 32.21	−0.26	−0.33	+0.22	−0.11	+0.07	31.90	19 19 33.62	1.72	0.11

$a' = +0^s.566$ (circle E.); $a'' = +0^s.604$ (circle W.); $c = 0^s.086$ (+ with circle E.).
Chronometer No. 1519, at $10^h\ 45^m$ chron. time, $7^h\ 51^m\ 1^s.61 \pm 0^s.016$ slow, losing 0.092 per hour.
$14^h\ 18^m$ $7^h\ 51^m\ 1^s.94$

Transits of stars observed at Shanghai, China, by Lieut. Commander C. H. Davis, U. S. N., to determine the correction of sidereal chronometer Negus 1254.

Date.	Name of Star.	Circle.	No. of threads.	Transit over mean of threads.	Flexure.	Level.	Azimuth.	Aberration and collimation.	Rate.	Seconds of corr. transit.	R. A.	Chron. correction.	v.
1881.				h. m. s.	s.	s.	s.	s.	s.	s.	h. m. s.	h. m. s.	s.
Sept. 14	σ^3 Ursæ Maj. S. P.	E.	7	12 55 15.13	−0.22	+0.06	+ 4.79	+0.31	−0.08	19.99	8 59 56.96	+8 4 [36.97]	. .
	77 Draconis	.	7	13 3 24.57	+1.74	−0.56	− 6.26	−0.72	−0.07	18.70	21 7 55.36	[36.66]	. .
	β Aquarii	.	5	12 20 43.22	+0.43	−0.13	+ 1.13	−0.15	−0.05	44.45	21 25 22.01	37.56	0.08
	κ Pegasi	.	7	13 34 41.70	+0.59	−0.21	+ 0.22	−0.17	−0.03	42.10	21 39 19.50	37.40	0.08
	16 Pegasi	.	7	13 43 5.13	+0.60	−0.17	+ 0.21	−0.17	−0.02	5.58	21 47 43.04	37.46	0.02
	20 Pegasi	.	7	13 50 43.47	+0.52	−0.15	+ 0.61	−0.16	−0.01	44.28	21 55 21.80	37.52	0.04
	α Aquarii	E.	7	13 55 6.09	+0.46	−0.13	+ 0.98	−0.15	0.00	7.25	21 59 44.67	37.42	0.06
	27(π^1) Pegasi	W.	7	13 59 24.69	−0.64	−0.04	− 0.07	+0.14	0.00	24.08	22 4 1.56	37.48	0.00
	π Pegasi	.	7	14 0 9.55	−0.64	−0.04	− 0.07	+0.14	0.00	8.94	22 4 46.44	37.50	0.02
	30 H. Camelop. S. P.	W.	7	14 11 25.30	+1.87	+0.19	+20.12	−1.28	+0.02	46.22	10 16 23.59	[37.37]	. .

$a' = +1^s.848$ (circle E.); $a'' = +2^s.633$ (circle W.); $c = 0^s.135$ (— with circle E.).
Chronometer No. 1254, at $13^h\ 58^m$ chron. time, $8^h\ 4^m\ 37^s.48 \pm 0^s.014$ slow, losing $0^s.075$ per hour.
$15^h\ 27^m$ $8^h\ 4^m\ 37^s.59$

Sept. 24	α Cephei	E.	7	13 10 57.12	+0.99	+0.17	+ 0.40	−0.27	−0.03	58.38	21 15 48.01	+8 4 [49.63]	. .
	h Ursæ Maj. S. P.	.	7	13 17 21.97	−0.10	−0.02	− 0.81	+0.20	−0.02	21.22	9 22 10.68	[49.46]	. .
	β Aquarii	.	7	13 20 32.25	+0.43	+0.10	− 0.22	−0.13	−0.02	32.41	21 25 21.92	49.51	0.13
	β Cephei (pr.)	.	3	13 22 20.48	+1.23	+0.29	+ 0.67	−0.37	−0.02	22.28	21 27 11.12	[48.84]	. .
	ε Pegasi	.	7	13 33 34.98	+0.51	+0.12	− 0.14	−0.13	−0.01	35.33	21 38 24.64	49.31	0.07
	κ Pegasi	.	7	13 34 29.51	+0.59	+0.14	− 0.04	−0.14	−0.01	30.05	21 39 19.41	49.36	0.02
	16 Pegasi	E.	7	13 42 53.04	+0.60	+0.17	− 0.04	−0.14	0.00	53.63	21 47 42.96	49.33	0.05
	20 Pegasi	W.	7	13 50 32.75	−0.52	+0.06	+ 0.04	+0.09	0.00	32.42	21 55 21.73	49.31	0.07
	α Aquarii	.	7	13 54 55.41	−0.46	+0.05	+ 0.07	+0.09	0.00	55.16	21 59 44.62	49.46	0.08
	20 Cephei	.	7	13 56 39.46	−0.99	+0.12	− 0.15	+0.19	+0.01	38.64	22 1 27.93	[49.29]	. .
	27(π^1) Pegasi	.	7	13 59 12.57	−0.64	+0.08	− 0.00	+0.11	+0.01	12.13	22 4 1.48	49.35	0.03
	π Pegasi	.	7	13 59 57.33	−0.64	+0.08	− 0.00	+0.11	+0.01	56.89	22 4 46.36	49.47	0.09
	24 Cephei	.	7	14 2 47.80	−1.31	+0.15	− 0.28	+0.25	+0.01	46.62	22 7 36.08	[49.46]	. .
	π Aquarii	W.	7	14 14 27.24	−0.46	+0.05	+ 0.07	+0.09	+0.02	27.01	22 19 16.35	49.34	0.04

$a' = -0^s.365$ (circle E.); $a'' = +0^s.137$ (circle W.); $c = 0^s.108$ (— with circle E.).
Chronometer No. 1254, at $13^h\ 48^m$ chron. time, $8^h\ 4^m\ 49^s.38 \pm 0^s.017$ slow, losing $0^s.043$ per hour.
$14^h\ 44^m$ $8^h\ 4^m\ 49^s.42$

Transits of stars observed at Hong-Kong, China, by Lieut. Commander F. M. Green, U. S. N., to determine the correction of sidereal chronometer Negus 1295.

Date.	Name of Star.	Circle.	No. of threads.	Transit over mean of threads.	Flexure.	Level.	Azimuth.	Aberration and collimation.	Rate.	Seconds of corr. transit.	R. A.	Chron. correction.	*v.*
1881.				*h.* *m.* *s.*	*s.*	*s.*	*s.*	*s.*	*s.*	*s.*	*h.* *m.* *s.*	*h.* *m.* *s.*	*s.*
Sept. 12	θ Serpentis	W.	7	11 13 38.86	−0.52	+0.03	+0.14	+0.99	−0.01	39.49	18 50 21.81	+7 36 42.32	0.00
	ε Aquilæ.	.	7	11 17 33.91	−0.56	+0.03	+0.05	+1.02	−0.01	34.44	18 54 16.68	42.24	0.08
	ν Draconis	.	7	11 19 9.33	−1.12	+0.06	−1.03	+3.06	−0.01	10.29	18 55 52.09	[41.80]	. .
	ι Lyræ	.	7	11 26 23.55	−0.66	+0.01	−0.13	+1.22	−0.01	23.98	19 3 6.30	42.32	0.00
	25 Camelop., S. P. .	.	7	11 29 27.41	+1.10	−0.02	+3.31	−7.72	0.00	24.08	7 6 6.23	[42.15]	. .
	ω Aquilæ.	W.	7	11 35 34.39	−0.55	0.00	+0.08	+1.01	0.00	34.93	19 12 17.40	+7 36 42.47	0.15
	κ Aquilæ.	E.	7	11 53 51.27	+0.48	−0.04	+0.24	−0.96	0.00	50.99	19 30 33.38	+7 36 42.39	0.07
	β Sagittarii.	.	7	11 59 3.98	+0.57	−0.02	+0.04	−0.99	0.00	3.58	19 35 45.82	42.24	0.08
	γ Aquilæ.	.	7	12 3 57.80	+0.54	0.00	+0.10	−0.96	0.00	57.48	19 40 39.86	42.38	0.06
	ϑ Sagittarii.	.	7	12 5 26.62	+0.58	+0.03	+0.04	−1.00	0.00	26.27	19 42 8.46	42.19	0.13
	ε Draconis	.	7	12 11 57.21	+0.54	+0.12	−1.04	−2.77	0.00	54.06	19 48 36.30	[42.24]	. .
	κ Cephei (pre.) . .	E.	7	12 36 16.94	+1.08	+0.16	−1.80	−4.34	+0.01	12.05	20 12 54.64	+7 36 [42.59]	. .

$a' = +0^s.44$ (with circle W.); $a'' = +0^s.48$ (circle E.); $c = 0^s.97$ (— with circle E.).
Chronometer No. 1295, at $11^h\ 55^m$ chron. time, $7^h\ 36^m\ 42^s.32 \pm 0^s.022$ slow, losing $0^s.011$ per hour.
$15^h\ 15^m$ $7^h\ 36^m\ 42^s.36$

Sept. 14	β Sagittarii.	E.	7	11 59 3.30	+0.57	−0.04	+0.02	−0.96	−0.01	2.88	19 35 45.78	+7 36 42.98	0.08
	γ Aquilæ.	.	7	12 3 57.29	+0.54	−0.05	+0.04	−0.93	0.00	56.89	19 40 39.83	42.94	0.04
	ϑ Sagittarii.	.	7	12 5 26.01	+0.58	−0.06	+0.01	−0.97	0.00	25.57	19 42 8.43	42.86	0.04
	α Aquilæ.	.	7	12 8 20.02	+0.54	−0.07	+0.05	−0.93	0.00	19.61	19 45 2.41	42.80	0.10
	ε Draconis	.	7	12 11 56.07	+1.08	−0.18	−0.43	−2.69	0.00	53.85	19 48 36.19	[42.34]	. .
	κ Cephei	E.	7	12 36 14.95	+1.44	−0.24	−0.75	−4.20	0.00	11.20	20 12 54.40	+7 36 [43.20]	.
	ε Delphini	W.	6	12 50 52.02	−0.55	+0.13	+0.05	+0.98	0.00	52.63	20 27 35.60	+7 36 42.97	0.03
	73 Draconis	.	7	12 56 22.35	−1.26	+0.25	−0.74	+3.60	0.00	24.20	20 33 6.76	[42.56]	. .
	ϑ Delphini	.	7	13 1 14.56	−0.56	+0.10	+0.03	+0.99	0.00	15.12	20 37 58.10	42.98	0.08
	γ Delphini	.	7	13 4 28.76	−0.57	+0.09	+0.03	+1.00	0.00	29.31	20 41 12.17	42.86	0.04
	λ Cygni	.	7	13 5 6.65	−0.66	+0.10	−0.07	+1.19	0.00	7.21	20 42 50.09	42.87	0.03
	μ Aquarii	.	7	13 9 34.87	−0.47	+0.06	+0.13	+0.97	0.00	35.56	20 46 18.42	42.86	0.04
	76 Draconis	W.	5	13 14 23.71	−2.01	+0.22	−1.57	+6.98	+0.01	27.34	20 51 10.42	[43.08]	. .

$a' = +0^s.20$ (circle E.); $a'' = +0^s.25$ (circle W); $c = 0^s.94$ (— with circle E.).
Chronometer No. 1295, at $12^h\ 37^m$ chron. time, $7^h\ 36^m\ 42^s.90 \pm 0^s.015$ slow, losing $0^s.018$ per hour.
$15^h\ 26^m$ $7^h\ 36^m\ 42^s.95$

Transits of stars observed at Hong-Kong, China, by Lieut. Commander F. M. Green, U. S. N., to determine the correction of sidereal chronometer Negus 1295.

Date.	Name of Star.	Circle.	No. of threads.	Transit over mean of threads.	Flexure.	Level.	Azimuth.	Aberration and collimation.	Rate.	Seconds of corr. transit.	R. A.	Chron. correction.	*v.*
1881.				*h.* *m.* *s.*	*s.*	*s.*	*s.*	*s.*	*s.*	*s.*	*h.* *m.* *s.*	*h.* *m.* *s.*	*s.*
Sept. 16	61[1] Cygni	W.	7	13 24 53.61	—0.67	+0.07	—0.05	+1.26	—0.01	54.21	21 1 37.84	+7 36 43.63	0.09
	77 Draconis	.	5	13 31 9.70	—1.46	+0.19	—0.54	+4.62	—0.01	12.30	21 7 55.83	[43.53]	. .
	a Equulei	.	7	13 33 12.28	—0.53	+0.08	+0.04	+0.99	—0.01	12.85	21 9 56.65	43.80	0.08
	1 Pegasi	.	7	13 39 54.86	—0.58	+0.10	+0.01	+1.05	—0.01	55.43	21 16 39.00	43.57	0.15
	1 Draconis., S. P. .	.	7	13 43 24.29	+0.84	—0.17	+0.96	—6.98	—0.01	18.93	9 20 1.82	[42.89]	. .
	β Aquarii	.	7	13 48 37.55	—0.49	+0.10	+0.07	+1.00	—0.01	38.22	21 25 21.99	43.77	0.05
	β Cephei	.	7	13 50 26.29	—1.08	+0.24	—0.30	+2.90	—0.01	28.04	21 27 11.42	[43.38]	. .
	ξ Aquarii	W.	7	13 54 45.03	—0.48	+0.11	+0.07	+1.00	—0.01	45.72	21 31 29.41	+7 36 43.69	0.03
	η Aquarii	E.	7	14 52 35.46	+0.51	+0.03	+0.08	—0.95	+0.01	35.14	22 29 18.90	+7 36 43.76	0.04
	31 Cephei	.	7	14 56 13.74	+1.19	+0.04	—0.61	—3.14	+0.01	11.23	22 32 55.90	[44.67]	. .
	ζ Pegasi	.	4	14 58 52.47	+0.55	+0.01	+0.04	—0.96	+0.01	52.12	22 35 36.02	43.90	0.18
	η Pegasi	.	7	15 0 46.56	+0.63	0.00	—0.03	—1.09	+0.01	46.08	22 37 29.91	43.83	0.11
	λ Pegasi	.	7	15 4 9.20	+0.60	—0.01	0.00	—1.03	+0.01	8.77	22 40 52.39	43.62	0.10
	μ Pegasi	.	7	15 7 36.90	+0.60	—0.02	—0.01	—1.04	+0.01	36.44	22 44 20.04	43.60	c. 12
	α Pegasi	.	7	15 22 10.97	—0.56	—0.05	+0.03	—0.98	+0.01	10.74	22 58 54.48	43.74	0.02
	π Cephei	E.	7	15 27 33.38	+1.26	—0.14	—0.66	—3.61	+0.01	30.24	23 4 14.14	+7 36 [43.90]	. .

$a' = +0^s.14$ (circle W.); $a'' = +0^s.22$ (circle E.); $c = 0^s.97$ (— with circle E.).

Chronometer No. 1295, at $14^h\ 26^m$ chron. time, $7^h\ 36^m\ 43^s.72 \pm 0^s.018$ slow, losing $0^s.012$ per hour.

$14^h\ 18^m$ $7^h\ 36^m\ 43^s.72$

Sept. 24	73 Draconis	E.	7	12 56 20.34	+1.26	—0.21	+0.53	—2.02	0.00	19.90	20 33 6.11	+7 36 [46.21]	. .
	ϑ Delphini	.	7	13 1 11.97	+0.56	—0.08	—0.02	—0.56	0.00	11.87	20 37 57.97	46.10	0.03
	γ Delphini	.	7	13 4 26.05	+0.57	—0.07	—0.02	—0.56	0.00	25.97	20 41 12.04	46.07	0.06
	λ Cygni	.	7	13 6 3.77	+0.66	—0.07	+0.05	—0.67	0.00	3.74	20 42 49.93	46.19	0.06
	μ Aquarii	.	7	13 9 32.41	+0.47	—0.04	—0.10	—0.55	0.00	32.19	20 46 18.31	46.12	0.01
	76 Draconis	.	7	13 14 24.36	+2.01	—0.15	+1.13	—3.93	0.00	23.42	20 51 9.20	[45.78]	. .
	61[1] Cygni	E.	7	13 24 51.62	+0.67	—0.04	+0.06	—0.69	0.00	51.62	21 1 37.72	+7 36 46.10	0.03
	77 Draconis	W.	7	13 31 6.53	—1.46	—0.29	+1.73	+2.71	0.00	9.22	21 7 54.66	7 36 [45.44]	. .
	τ Cygni	.	7	13 33 19.96	—0.67	—0.13	+0.15	+0.73	0.00	20.06	21 10 6.22	46.16	0.03
	1 Pegasi	.	7	13 39 52.88	—0.58	—0.11	—0.02	+0.61	0.00	52.78	21 16 38.93	46.15	0.02
	1 Draconis S. P. .	.	7	13 43 23.09	+0.84	+0.17	—3.07	—4.11	0.00	16.92	9 20 2.73	[45.81]	. .
	β Aquarii	.	7	13 48 35.89	—0.49	—0.08	—0.21	+0.58	0.00	35.69	21 25 21.92	46.23	0.10
	ξ Aquarii	.	7	13 54 43.37	—0.48	—0.07	—0.23	+0.58	0.00	43.17	21 31 29.35	46.18	0.05
	ε Pegasi	.	7	14 1 38.64	—0.54	—0.07	—0.10	+0.59	0.00	38.52	21 38 24.64	46.12	0.01
	κ Pegasi	W.	6	14 2 33.40	—0.61	—0.07	+0.02	+0.64	0.00	33.38	21 39 19.41	46.03	0.10

$a' = -0^s.18$ (circle E.); $a'' = -0^s.45$ (circle W.); $c = 0^s.56$ (— with circle E.).

Chronometer No. 1295, at $13^h\ 30^m$ chron. time, $7^h\ 36^m\ 46^s.13 \pm 0^s.012$ slow, losing $0^s.01$ per hour.

$14^h\ 44^m$ $7^h\ 36^m\ 46^s.14$

Transits of stars observed at Hong Kong, China, by Lieut. Commander F. M. Green, U. S. N., to determine the correction of sidereal chronometer Negus 1295.

Date.	Name of Star.	Circle.	No. of threads.	Transit over mean of threads.	Flexure.	Level.	Azimuth.	Aberration and collimation.	Rate.	Seconds of corr. transit.	R. A.	Chron. correction.	v_0
1881.				*h.* *m.* *s.*	*s.*	*s.*	*s.*	*s.*	*s.*	*s.*	*h.* *m.* *s.*	*h.* *m.* *s.*	*s.*
Oct. 30	16 Pegasi	E.	7	14 11 0.22	+0.61	0.00	−0.05	−0.01	+0.02	0.79	21 47 42.47	+7 36 41.68	0.03
	79 Draconis	.	7	14 14 45.19	+1.20	0.00	−2.25	−0.03	+0.02	44.13	21 51 25.81	[41.68]	. .
	20 Pegasi	.	7	14 18 38.88	+0.56	−0.01	+0.15	−0.01	+0.01	39.58	21 55 21.31	41.73	0.02
	α Aquarii	.	7	14 23 1.65	+0.51	−0.02	+0.32	−0.01	+0.01	2.46	21 59 44.23	41.77	0.06
	ι Pegasi	.	7	14 24 49.76	+0.60	−0.02	−0.04	−0.01	+0.01	50.30	22 1 32.03	41.73	0.02
	θ Pegasi	.	7	14 27 33.33	+0.53	−0.03	+0.24	−0.01	+0.01	34.03	22 4 15.73	41.70	0.01
	24 Cephei	E.	7	14 30 53.73	+1.14	−0.06	−2.04	−0.03	+0.01	52.75	22 7 34.39	7 36 [41.64]	. .
	γ Aquarii	W.	7	14 38 53.29	−0.50	−0.05	+0.34	+0.05	0.00	53.13	22 15 35.00	7 36 41.87	0.16
	η Aquarii	.	7	14 52 37.15	−0.51	−0.06	+0.32	+0.05	0.00	36.95	22 29 18.56	41.61	0.10
	31 Cephei	.	7	14 56 15.39	−1.19	−0.13	−2.18	+0.17	0.00	12.36	22 32 54.16	[41.86]	. .
	η Pegasi	.	7	15 0 48.60	−0.63	−0.07	−0.12	+0.06	−0.01	47.83	22 37 29.52	41.69	0.02
	λ Pegasi	.	7	15 4 10.98	−0.60	−0.07	−0.01	+0.05	−0.01	10.34	22 40 52.06	41.72	0.01
	α Pegasi	.	7	15 22 13.06	−0.56	−0.06	+0.11	+0.05	−0.01	12.59	22 58 54.21	41.62	0.09
	π Cephei	W.	7	15 27 35.12	−1.26	−0.14	−2.47	+0.19	−0.02	31.42	23 4 12.68	[41.26]	. .

$a' = +0^s.84$ (circle E); $a'' = +0^s.82$ (circle W.); $c = 0^s.03$ (− with circle E.).

Chronometer No. 1295, at $14^h\ 49^m$ chron. time, $7^h\ 36^m\ 41^s.71 \pm 0^s.016$ slow, gaining $0^s.03$ per hour.

$17^h\ 0^m$ $7^h\ 36^m\ 41^s.65$

Nov. 1	61′ Cygni	W.	7	13 24 57.13	−0.67	+0.07	0.00	0.00	+0.02	56.55	21 1 36.97	+7 36 40.42	0.06
	77 Draconis	.	7	13 31 12.48	−1.46	+0.13	0.00	0.00	+0.02	11.17	21 7 51.16	[39.99	. .
	α Equulei	.	7	13 33 16.20	−0.53	+0.04	0.00	0.00	+0.02	15.73	21 9 56.04	40.31	0.05
	1 Pegasi	.	7	13 39 58.44	−0.58	+0.03	0.00	0.00	+0.01	57.90	21 16 38.36	40.46	0.10
	1 Draconis S. P. .	.	7	13 43 28.49	+0.84	−0.03	0.00	0.00	+0.01	29.31	21 20 8.41	[39.10]	. .
	β Aquarii	.	7	13 48 41.58	−0.49	+0.01	0.00	0.00	+0.01	41.11	21 25 21.43	40.32	0.04
	ϵ Pegasi	W.	7	14 1 44.37	−0.54	0.00	0.00	0.00	0.00	43.83	21 38 24.17	7 36 40.34	0.02
	16 Pegasi	E.	7	14 11 1.47	+0.61	+0.07	0.00	+0.04	0.00	2.19	21 47 42.44	7 36 40.25	0.11
	79 Draconis	.	6	14 14 44.08	+1.20	+0.13	+0.05	+0.14	0.00	45.60	21 51 25.67	[40.07]	. .
	20 Pegasi	.	7	14 18 40.24	+0.56	+0.06	0.00	+0.04	0.00	40.90	21 55 21.28	40.38	0.02
	α Aquarii	.	7	14 23 3.30	+0.51	+0.06	−0.01	+0.04	−0.01	3.89	21 59 44.20	40.31	0.05
	ι Pegasi	.	7	14 24 50.97	+0.60	+0.07	0.00	+0.04	−0.01	51.67	22 1 32.00	40.33	0.03
	γ Aquarii	.	7	14 38 53.54	+0.50	+0.05	−0.01	+0.04	−0.01	54.11	22 15 34.57	40.46	0.10
	π Aquarii	.	7	14 42 35.04	+0.51	+0.06	−0.01	+0.04	−0.01	35.63	22 19 15.99	40.36	0.00
	31 Cephei	E.	7	14 56 11.95	+1.19	+0.13	+0.05	+0.14	−0.01	13.45	22 32 54.04	[40.59]	. .

$a' = 0^s.00$ (circle W.); $a'' = -0^s.02$ (circle E.); $c = 0^s.02$ (+ with circle E.).

Chronometer No. 1295, at $14^h\ 10^m$ chron. time, $7^h\ 36^m\ 40^s.36 \pm 0^s.015$ slow, gaining $0^s.03$ per hour.

$16^h\ 54^m$ $7^h\ 36^m\ 40^s.28$

Transits of stars observed at Manila, Philippine Islands, by Lieut. Commander C. H. Davis, U. S. N., to determine the correction of sidereal chronometer Negus 1254.

Date.	Name of Star.	Circle.	No. of threads.	Transit over mean of threads.	Flexure.	Level.	Azimuth.	Aberration and collimation.	Rate.	Seconds of corr. transit.	R. A.	Chron. correction.	r'.
1881.				*h.* *m.* *s.*	*s.*	*s.*	*s.*	*s.*	*s.*	*s.*	*h.* *m.* *s.*	*h.* *m.* *s.*	*s.*
Oct. 30	β Aquarii	E.	7	13 21 34.38	+0.51	−0.03	+0.44	+0.10	−0.09	35.32	21 25 21.46	+8 3 46.14	0.06
	β Cephei (pr.)	.	3	13 23 24.84	+0.90	−0.05	−3.01	+0.28	−0.09	21.87	21 27 9.26	[47.39]	. .
	11 Cephei	.	7	13 36 29.49	+0.91	−0.11	−3.15	+0.29	−0.07	27.36	21 40 13.01	[45.65]	. .
	79 Draconis	.	6	13 47 41.67	+0.97	−0.11	−3.67	+0.33	−0.05	39.14	21 51 25.81	[46.67]	. .
	20 Pegasi	.	7	13 51 34.45	+0.55	−0.06	+0.04	+0.10	−0.04	35.04	21 55 21.31	46.27	0.07
	α Aquarii	.	7	13 55 57.27	+0.52	−0.06	+0.33	+0.10	−0.03	58.13	21 59 44.23	46.10	0.10
	η Pegasi	.	7	14 0 28.77	+0.54	−0.06	+0.20	+0.10	−0.03	29.52	22 4 15.73	46.21	0.01
	24 Cephei	.	7	14 3 50.59	+0.94	−0.14	−3.35	+0.30	−0.02	48.32	22 7 34.39	[46.07]	. .
	31 Pegasi	E.	7	14 11 56.80	+0.55	−0.08	+0.07	+0.10	−0.01	57.43	22 15 43.55	46.12	0.08
	σ Aquarii	W.	7	14 20 39.02	−0.50	−0.03	+0.56	−0.14	+0.01	38.92	22 24 25.01	46.09	0.11
	η Aquarii	.	7	14 25 32.78	−0.52	−0.04	+0.32	−0.14	+0.02	32.42	22 29 18.56	46.14	0.06
	31 Cephei	.	7	14 29 13.50	−0.97	−0.10	−3.65	−0.46	+0.02	8.34	22 32 54.16	[45.82]	. .
	30 Cephei	.	6	14 30 46.50	−0.79	−0.09	−2.06	−0.30	+0.02	43.28	22 34 29.97	[46.69]	. .
	ξ Pegasi	.	7	14 31 49.88	−0.55	−0.06	+0.10	−0.14	+0.03	49.26	22 35 35.70	46.44	0.24
	ι Cephei	.	7	14 41 48.58	−0.82	−0.10	−2.35	−0.33	+0.04	45.02	22 45 31.15	[46.13]	. .
	α Pegasi	.	7	14 55 8.60	−0.56	−0.10	0.00	−0.14	+0.06	7.86	22 58 54.21	46.35	0.15
	φ Aquarii	W.	7	15 4 27.97	−0.51	−0.09	+0.42	−0.14	+0.08	27.73	23 8 13.86	46.13	0.07

$a' = +1^s.248$ (circle E.); $a'' = +1^s.249$ (circle W.); $c = 0^s.115$ (+ with circle E.).

Chronometer No. 1254, at $14^h\ 16^m$ chron. time, $8^h\ 3^m\ 46^s.20 \pm 0^s.025$ slow, losing $0^s.098$ per hour.

$17^h\ 0^m$ $8^h\ 3^m\ 46^s.47$

Nov. 1	11 Cephei	E.	7	13 36 22.74	+0.91	+0.05	−1.37	+0.42	−0.05	22.70	21 40 12.89	+8 3 [50.19]	. .
	79 Draconis	.	7	13 47 34.90	+0.97	+0.09	−1.60	+0.48	−0.03	34.81	21 51 25.68	[50.87]	. .
	20 Pegasi	.	7	13 51 20.99	+0.55	+0.05	+0.02	+0.14	−0.03	30.72	21 55 21.28	50.56	0.03
	α Aquarii	.	7	13 55 52.83	+0.52	+0.06	+0.14	+0.14	−0.02	53.67	21 59 44.20	50.53	0.00
	η Pegasi	.	7	14 0 24.37	+0.54	+0.08	+0.09	+0.14	−0.02	25.20	22 4 15.71	50.51	0.02
	24 Cephei	.	7	14 3 43.65	+0.94	+0.16	−1.46	+0.44	−0.01	43.72	22 7 34.28	[50.56]	. .
	31 Pegasi	.	7	14 11 52.16	+0.55	+0.12	+0.03	+0.14	0.00	53.00	22 15 43.53	50.53	0.00
	π Aquarii	E.	7	14 15 24.55	+0.52	+0.12	+0.13	+0.14	0.00	25.46	22 19 15.98	50.52	0.01
	226 Cephei	W.	7	14 26 30.23	−1.05	+0.43	−4.21	−0.72	+0.02	24.70	22 30 15.03	[50.33]	. .
	ι Cephei	.	7	14 41 43.63	−0.82	+0.24	−2.25	−0.43	+0.04	40.41	22 45 31.08	[50.67]	. .
	α Pegasi	.	7	14 55 4.25	−0.56	+0.13	0.00	−0.18	+0.06	3.70	22 58 54.19	50.49	0.04
	γ Pegasi	W.	7	16 3 21.06	−0.56	+0.09	+0.00	−0.18	+0.16	20.57	0 7 11.11	50.54	0.01

$a' = +0^s.542$ (circle E.); $a'' = +1^s.195$ (circle W.); $c = 0^s.159$ (+ with circle E.).

Chronometer No. 1254, at $14^h\ 12^m$ chron. time, $8^h\ 3^m\ 50^s.53 \pm 0^s.006$ slow, losing $0^s.085$ per hour.

$16^h\ 54^m$ $8^h\ 3^m\ 50^s.76$

Transits of stars observed at Hong-Kong, China, by Lieut. Commander F. M. Green, U. S. N., to determine the correction of sidereal chronometer Negus 1295.

Date.	Name of Star.	Circle.	No. of threads.	Transit over mean of threads.	Flexure.	Level.	Azimuth.	Aberration and collimation.	Rate.	Seconds of corr. transit.	R. A.	Chron. correction.	r.
				h. m. s.	s.	s.	s.	s.	s.	s.	h. m. s	h. m. s.	s.
1881.													
Nov. 2	ν Aquarii	E.	7	14 38 54.48	+0.50	+0.11	−0.07	−0.06	+0.02	54.97	22 15 34.56	+7 36 39.59	0.03
	π Aquarii	.	7	14 42 35.94	+0.51	+0.10	−0.06	−0.06	+0.01	36.44	22 19 15.97	39.53	0.09
	η Aquarii	.	7	14 52 38.35	+0.51	+0.10	−0.06	−0.06	+0.01	38.85	22 29 18.52	39.67	0.05
	31 Cephei	.	7	14 56 12.94	+1.19	+0.24	+0.42	−0.20	+0.01	14.58	22 32 53.99	[39.41]	. .
	ζ Pegasi	.	7	14 58 55.43	+0.55	+0.10	−0.03	−0.06	0.00	55.99	22 35 35.66	39.67	0.05
	η Pegasi	E.	7	15 0 49.27	+0.63	+0.10	−0.03	−0.07	0.00	49.90	22 37 29.48	+7 36 39.58	0.04
	μ Pegasi	W.	7	15 7 40.47	−0.60	+0.07	0.00	+0.11	0.00	40.05	22 44 19.67	+7 36 39.62	0.00
	ι Cephei	.	6	15 8 52.29	−0.07	+0.11	−0.25	+0.24	0.00	51.41	22 45 31.12	[39.71]	. .
	β Pegasi	.	7	15 21 25.33	−0.62	+0.07	−0.01	+0.11	−0.01	24.87	22 58 4.55	39.68	0.06
	α Pegasi	.	7	15 22 15.04	−0.56	+0.06	+0.02	+0.10	−0.01	14.65	22 58 54.18	39.53	0.00
	π Cephei	.	7	15 27 34.03	−1.26	+0.14	−0.46	+0.38	−0.01	32.82	23 4 12.51	[39.69]	. .
	ω Aquarii	.	7	15 31 34.40	−0.55	+0.05	+0.07	+0.10	−0.01	34.06	23 8 13.83	39.77	0.15
	ν Piscium	.	7	15 34 24.81	−0.52	+0.06	+0.05	+0.10	−0.01	24.49	23 11 4.04	39.53	0.00
	τ Pegasi	W.	7	15 38 9.96	−0.60	+0.07	−0.00	+0.11	−0.02	9.52	23 14 49.10	+7 36 39.64	0.02

$a' = -0^s.16$ (circle E.); $a'' = +0^s.15$ (circle W.); $c = 0^s.08$ (− with circle E.)

Chronometer No. 1295, at $15^h\ 8^m$ chron. time, $7^h\ 36^m\ 39^s.62 \pm 0^s.015$ slow, gaining $0^s.03$ per hour.

$16^h\ 24^m$ $7^h\ 36^m\ 39^s.58$

Transits of stars observed at Manila, Philippine Islands, by Lieut. Commander C. H. Davis, U. S. N., to determine the correction of sidereal chronometer Negus 1254.

Date.	Name of Star.	Circle.	No. of threads.	Transit over mean of threads.	Flexure.	Level.	Azimuth.	Aberration and collimation.	Rate.	Seconds of corr. transit.	R. A.	Chron. correction.	r.
				h. m. s.	s.	s.	s.	s.	s.	s.	h. m. s.	h. m. s.	s.
1881.													
Nov. 2	79 Draconis	W.	7	13 47 33.21	−0.97	+0.23	+1.93	−0.66	−0.06	33.68	21 51 25.61	+8 3 [51.93]	. .
	20 Pegasi	.	7	13 51 29.37	−0.55	+0.16	−0.02	−0.20	−0.06	28.70	21 55 21.27	52.57	0.08
	α Aquarii	.	7	13 55 52.63	−0.52	+0.21	−0.17	−0.19	−0.05	51.91	21 59 44.19	52.28	0.23
	β Pegasi	.	7	14 0 23.93	−0.54	+0.31	−0.10	−0.19	−0.05	23.36	22 4 15.69	52.33	0.18
	24 Cephei	.	7	14 3 40.76	−0.94	+0.55	+1.76	−0.61	−0.04	41.48	22 7 34.22	[52.74]	. .
	31 Pegasi	.	7	14 11 51.37	−0.55	+0.17	−0.03	−0.20	−0.03	50.73	22 15 43.51	52.78	0.27
	π Aquarii	.	7	14 15 24.16	−0.52	+0.09	−0.16	−0.19	−0.03	23.35	22 19 15.97	52.62	0.11
	226 Cephei	W.	7	14 26 21.42	−1.05	+0.31	+2.31	−0.77	−0.01	22.21	22 30 14.96	[52.75]	. .
	ι Cephei	E.	7	14 41 37.81	+0.82	+0.19	−0.50	+0.37	+0.01	38.70	22 45 31.04	[52.34]	. .
	α Pegasi	.	7	14 55 0.78	+0.56	+0.09	0.00	+0.16	+0.02	1.61	22 58 54.18	52.57	0.08
	π Cephei	.	7	15 0 19.04	+1.02	0.00	−0.88	+0.58	+0.03	19.79	23 4 12.51	[52.72]	. .
	φ Aquarii	.	7	15 4 20.41	+0.51	+0.04	+0.10	+0.15	+0.04	21.25	23 8 13.83	52.58	0.07
	γ Piscium	.	7	15 7 10.71	+0.53	+0.06	+0.06	+0.15	+0.04	11.55	23 11 4.04	52.49	0.02
	o Cephei	.	7	15 9 56.50	+0.85	+0.15	−0.56	+0.40	+0.04	57.38	23 13 49.90	[52.52]	. .
	κ Piscium	.	7	15 17 0.86	+0.52	+0.07	+0.06	+0.15	+0.05	1.71	23 20 54.20	52.49	0.02
	70 Pegasi	E.	7	15 19 19.26	+0.55	+0.06	+0.01	+0.16	+0.06	20.10	23 23 12.51	52.41	0.14

$a' = -0^s.655$ (circle W.); $a'' = +0^s.268$ (circle E.); $c = 0^s.172$ (+ with circle E.).

Chronometer No. 1254, at $14^h\ 36^m$ chron. time, $8^h\ 3^m\ 52^s.51 \pm 0^s.031$ slow, losing $0^s.077$ per hour.

$16^h\ 24^m$ $8^h\ 3^m\ 52^s.65$

Transits of stars observed at Singapore, China, by Lieut. Commander F. M. Green, U. S. N., to determine the correction of sidereal chronometer Negus 1295.

Date.	Name of Star.	Circle.	No. of threads.	Transit over mean of threads.	Flexure.	Level.	Azimuth.	Aberration and collimation.	Rate.	Seconds of corr. transit.	R. A.	Chron. correction.	r'.
1881.				*h.* *m.* *s.*	*s.*	*s.*	*s.*	*s.*	*s.*	*s.*	*h.* *m.* *s.*	*h.* *m.* *s.*	*s.*
Dec. 4	ω Piscium	W.	7	16 58 0.00	−0.55	−0.10	+0.05	−0.90	0.00	58.50	23 53 16.23	+6 55 17.73	0.01
	γ Pegasi	.	7	17 11 54.70	−0.55	−0.16	+0.15	−0.92	0.00	53.22	0 7 10.84	17.62	0.12
	ι Ceti	.	7	17 18 10.10	−0.55	−0.25	−0.12	−0.92	0.00	8.26	0 13 26.06	17.80	0.06
	44 Piscium	.	7	17 24 6.40	−0.55	−0.25	0.00	−0.89	0.00	4.71	0 19 22.43	17.72	0.02
	12 Ceti	.	7	17 28 46.16	−0.55	−0.25	−0.06	−0.89	0.00	44.45	0 24 2.20	17.75	0.01
	κ Cassiopeæ	.	7	17 31 4.31	−0.57	−0.25	+1.17	−1.91	0.00	2.75	0 26 20.47	[17.72]	. .
	13 Ceti	.	7	17 33 55.60	−0.55	−0.24	−0.06	−0.89	0.00	53.86	0 29 11.63	17.77	0.03
	21 Cassiopeæ	.	7	17 42 40.73	−0.59	−0.25	+2.20	−3.38	0.00	38.71	0 37 56.34	[17.63]	. .
	δ Piscium	W.	7	17 47 18.84	−0.55	−0.23	+0.06	−0.90	0.00	17.22	0 42 35.01	+6 55 17.79	0.05
	ϵ Piscium	E.	7	18 1 31.24	+0.55	+0.16	+0.03	+0.94	0.00	32.92	0 56 50.61	+6 55 17.69	0.05
	τ Piscium	.	7	18 9 51.79	+0.56	+0.15	+0.16	+1.06	0.00	53.72	1 5 11.56	17.84	0.10
	ν Piscium	.	7	18 17 40.98	+0.56	+0.12	+0.14	+1.04	0.00	42.84	1 13 0.69	17.85	0.11
	θ Ceti	.	7	18 22 49.66	+0.55	+0.11	−0.05	+0.94	0.00	51.21	1 18 8.97	17.76	0.02
	38 Cassiopeæ	.	7	18 27 10.14	+0.58	+0.10	+0.78	+2.68	0.00	14.28	1 22 31.91	[17.63]	. .
	40 Cassiopeæ	.	7	18 33 48.70	+0.60	+0.09	+0.91	+3.08	0.00	53.38	1 29 11.14	[17.76]	. .
	π Piscium	.	7	18 35 33.07	+0.55	+0.07	+0.05	+0.95	0.00	34.69	1 30 52.30	17.61	0.13
	ν Piscium	E.	7	18 39 59.83	+0.55	+0.06	+0.02	+0.93	0.00	1.39	1 35 19.06	17.67	0.07

$a' = -0^s.62$ (circle W.); $a'' = -0^s.29$ (circle E.); $c = 0^s.91$ (+ with circle E.).

Chronometer No. 1295, at $17^h\ 49^m$ chron. time, $6^h\ 55^m\ 17^s.74 \pm 0^s.014$ slow, losing $0^s.005$ per hour.

$19^h\ 16^m$ $6^h\ 55^m\ 17^s.75$

Date.	Name of Star.	Circle.	No. of threads.	Transit over mean of threads.	Flexure.	Level.	Azimuth.	Aberration and collimation.	Rate.	Seconds of corr. transit.	R. A.	Chron. correction.	r'.
Dec. 5	ν Piscium	E.	7	18 39 59.68	+0.55	+0.14	+0.04	+0.73	0.00	1.14	1 35 19.06	+6 55 17.92	0.07
	o Piscium	.	6	18 43 52.03	+0.55	+0.19	+0.08	+0.74	0.00	53.59	1 39 11.46	17.87	0.02
	ϵ Cassiopeæ	.	7	18 50 36.88	+0.57	+0.25	+1.24	+1.61	0.00	40.55	1 45 58.49	[17.94]	. .
	β Arietis	.	7	18 52 40.50	+0.55	+0.29	+0.22	+0.78	0.00	51.34	1 48 9.20	17.86	0.01
	α Arietis	.	7	19 5 13.53	+0.57	+0.40	+0.25	+0.79	0.00	15.54	2 0 33.32	17.78	0.07
	ξ^1 Ceti	E.	7	19 11 26.97	+0.55	+0.44	+0.08	+0.74	0.00	28.78	2 6 46.58	+6 55 17.80	0.05
	ν Arietis	W.	6	19 36 51.72	−0.55	+0.50	+0.33	−0.74	0.00	51.16	2 32 9.05	+6 55 17.89	0.04
	δ Ceti	.	7	19 38 10.76	−0.55	+0.50	−0.02	−0.69	0.00	10.00	2 33 27.91	17.91	0.06
	γ Ceti	.	7	19 41 55.97	−0.55	+0.49	+0.02	−0.69	0.00	55.24	2 37 13.05	17.81	0.04
	μ Ceti	.	7	19 43 18.58	−0.55	+0.48	+0.13	−0.71	0.00	17.93	2 38 35.72	17.79	0.06
	47 Cephei	.	7	19 55 17.46	−0.56	+0.50	+4.59	−3.60	0.00	18.39	2 50 36.22	[17.83]	. .
	ζ Arietis	.	7	20 12 52.13	−0.55	+0.42	+0.32	−0.74	0.00	51.58	3 8 9.36	17.78	0.07
	ξ Tauri	W.	7	20 25 31.35	−0.55	+0.41	+0.13	−0.70	0.00	30.64	3 20 48.53	+6 55 17.89	0.04

$a' = -0^s.64$ (circle E.); $a'' = -0^s.90$ (circle W.); $c = 0^s.71$ (+ with circle E.).

Chronometer No. 1295, at $19^h\ 32^m$ chron. time, $6^h\ 55^m\ 17^s.85 \pm 0^s.01$ slow, losing $0^s.005$ per hour.

$21^h\ 6^m$ $6^h\ 55^m\ 17^s.85$

Transits of stars observed at Cape Saint James, Cochin China, by Lieut. Commander C. H. Davis, U. S. N., to determine the correction of sidereal chronometer Negus 1254.

Date.	Name of Star.	Circle.	No. of threads.	Transit over mean of threads.	Flexure.	Level.	Azimuth.	Aberration and collimation.	Rate.	Seconds of corr. transit.	R. A.	Chron. correction.	r.
1881.				h. m. s.	s.	s.	s.	s.	s.	s.	h. m. s.	h. m. s.	s.
Dec. 4	α Pegasi	W.	7	15 49 43.67	−0.58	+0.10	−0.13	−0.08	−0.18	42.80	22 58 53.79	+7 9 10.99	0.22
	π Cephei	.	3	15 55 2.48	−0.89	+0.11	−1.34	−0.27	−0.17	59.92	23 4 10.37	[10.45]	. .
	γ Piscium	.	5	16 1 53.59	−0.54	+0.03	+0.05	−0.07	−0.16	52.90	23 11 3.69	10.79	0.02
	4 Cassiopeæ	.	5	16 10 28.55	−0.71	+0.04	−0.61	−0.15	−0.16	26.96	23 19 37.38	[10.42]	. .
	κ Piscium	.	7	16 11 43.74	−0.53	+0.03	+0.07	−0.07	−0.15	43.09	23 20 53.85	10.76	0.01
	θ Piscium	.	7	16 12 49.76	−0.54	+0.03	+0.03	−0.07	−0.15	49.06	23 21 59.85	10.79	0.02
	70 Pegasi	W.	7	16 14 2.13	−0.55	+0.03	−0.01	−0.07	−0.15	1.38	23 23 12.16	10.78	0.01
	ε Cassiopeæ	E.	5	18 36 48.34	+0.72	−0.04	−1.51	+0.07	+0.03	47.61	1 45 58.50	[10.89]	.
	α Ceti	.	6	19 46 57.12	+0.54	−0.08	+0.10	+0.03	+0.12	57.83	2 56 8.62	10.79	0.02
	f Tauri	.	7	20 15 12.22	+0.55	−0.09	−0.03	+0.03	+0.15	12.83	3 24 23.62	10.79	0.02
	ε Eridani	.	7	20 18 12.62	+0.52	−0.09	+0.30	+0.03	+0.16	13.54	3 27 24.20	10.66	0.11
	Groom. 716	.	1	20 22 49.45	+0.72	−0.16	−1.49	+0.07	+0.16	48.75	3 31 59.83	[11.08]	. .
	γ Camelop., H.	.	6	20 28 51.39	+0.81	−0.21	−2.29	+0.09	+0.17	49.96	3 38 1.00	[11.04]	. .
	ρ H. Camelop.	.	7	20 37 58.87	+0.70	−0.14	−1.35	+0.06	+0.18	58.32	3 47 9.08	[10.76]	. .
	λ Tauri	.	6	20 44 59.48	+0.55	−0.10	−0.03	+0.03	+0.19	0.12	3 54 10.74	10.62	0.15
	ν Tauri	E.	7	20 47 43.44	+0.54	−0.09	+0.07	+0.03	+0.19	44.18	3 56 54.87	10.69	0.08

$a' = +0^s.392$ (circle W.); $a'' = +0'.858$ (circle E.); $c = 0^s.051$ (+ with circle E.).
Chronometer No. 1254, at $18^h\ 14^m$ chron. time, $7^h\ 9^m\ 10^s.77 \pm 0^s.021$ slow, losing $0^s.075$ per hour.
$19^h\ 16^m$ $7^h\ 9^m\ 10^s.84$

Dec. 5	ζ Piscium	E.	7	16 1 50.21	+0.54	+0.03	+0.13	+0.35	−0.04	51.22	23 11 3.68	+7 9 12.46	0.04
	o Cephei	.	7	16 4 36.20	+0.76	+0.03	−2.10	+0.91	−0.04	35.76	23 13 48.51	[12.75]	. .
	4 Cassiopeæ	.	7	16 10 25.07	+0.71	+0.01	−1.57	+0.73	−0.03	24.92	23 19 37.35	[12.43]	. .
	κ Piscium	.	7	16 11 40.37	+0.53	+0.01	+0.16	+0.35	−0.03	41.39	23 20 53.84	12.45	0.05
	θ Piscium		7	16 12 46.44	+0.54	0.00	+0.08	+0.35	−0.02	47.39	23 21 59.84	12.45	0.05
	70 Pegasi	.	7	16 13 58.80	+0.55	0.00	−0.03	+0.35	−0.02	59.65	23 23 12.15	12.50	0.00
	ι Piscium	E.	7	16 24 40.37	+0.54	−0.03	+0.09	+0.35	−0.01	41.31	23 33 53.84	12.53	0.03
	41 H. Cephei	W.	7	16 33 12.69	−0.76	+0.09	−5.31	−1.01	0.00	5.70	23 42 18.38	[12.68]	. .
	φ Pegasi	.	7	16 37 18.92	−0.56	+0.05	−0.37	−0.41	+0.01	17.64	23 46 30.24	12.60	0.10
	Groom. 4163	.	7	16 40 6.38	−0.86	+0.07	−7.88	−1.40	+0.01	56.32	23 49 8.89	[12.57]	. .
	ω Piscium	.	7	16 44 4.45	−0.54	+0.03	+0.18	−0.39	+0.02	3.75	23 53 16.22	12.47	0.03
	33 Piscium	.	7	16 50 6.57	−0.52	+0.03	+0.71	−0.39	+0.02	6.42	23 59 18.79	12.37	0.13
	γ Pegasi	.	7	16 57 59.19	−0.56	+0.01	−0.18	−0.40	+0.03	58.09	0 7 10.82	12.73	0.23
	Groom. 29	.	7	17 0 36.69	−0.93	+0.01	−9.50	−1.65	+0.04	24.66	0 9 36.67	[12.01]	. .
	ι Ceti	W.	7	17 4 13.66	−0.51	0.00	+0.85	−0.40	+0.04	13.64	0 13 26.04	12.40	0.10

$a' = +0^s.958$ (circle E.); $a'' = +2^s.465$ (circle W.); $c = 0^s.370$ (+ with circle E.).
Chronometer No. 1254, at $16^h\ 32^m$ chron. time, $7^h\ 9^m\ 12^s.50 \pm 0^s.022$ slow, losing $0^s.079$ per hour.
$21^h\ 6^m$ $7^h\ 9^m\ 12^s.86$

ansits of stars observed at Singapore, China, by Lieut. Commander F. M. Green, U. S. N., to determine the correction of sidereal chronometer Negus 1295.

Date.	Name of Star.	Circle.	No. of threads.	Transit over mean of threads.	Flexure.	Level.	Azimuth.	Aberration and collimation.	Rate.	Seconds of corr. transit.	R. A.	Chron. correction.	r.
881.				*h.* *m.* *s.*	*s.*	*s.*	*s.*	*s.*	*s.*	*s.*	*h.* *m.* *s.*	*h.* *m.* *s.*	*s.*
. 6	π Piscium	W.	7	18 35 35.29	—0.55	—0.03	—0.06	—0.55	—0.01	34.09	1 30 52.28	+6 55 18.19	0.01
	ρ Piscium	.	7	18 40 1.99	—0.55	—0.02	—0.03	—0.54	—0.01	0.84	1 35 19.05	18.21	0.03
	o Piscium	.	7	18 43 54.44	—0.55	—0.02	—0.05	—0.55	—0.01	53.26	1 39 11.45	18.19	0.01
	ϵ Cassiopeæ	.	7	18 50 42.81	—0.57	—0.01	—0.78	—1.19	—0.01	41.25	1 45 58.47	[17.22]	. .
	50 Cassiopeæ	.	7	18 58 13.16	—0.59	—0.01	—1.21	—1.73	0.00	9.62	1 53 27.62	[18.00]	. .
	α Arietis	.	7	19 5 16.49	—0.57	0.00	—0.16	—0.59	0.00	15.17	2 0 33.31	18.14	0.04
	ξ Ceti	W.	7	19 11 29.53	—0.55	0.00	—0.05	—0.55	0.00	28.38	2 6 46.57	+6 55 18.19	0.01
	σ Arietis	E.	7	20 12 49.93	+0.55	+0.38	—0.29	+0.62	0.00	51.19	3 8 9.36	+6 55 18.17	0.01
	o Tauri	.	7	20 23 10.33	+0.55	+0.35	—0.11	+0.59	+0.01	11.72	3 18 29.87	18.15	0.03
	ξ Tauri	.	7	20 25 28.98	+0.55	+0.32	—0.12	+0.59	+0.01	30.33	3 20 48.53	18.20	0.02
	f Tauri	.	7	20 29 4.18	+0.55	+0.30	—0.16	+0.59	+0.01	5.47	3 24 23.63	18.16	0.02
	ϵ Eridani	.	7	20 32 4.36	+0.55	+0.28	+0.16	+0.59	+0.01	5.95	3 27 24.20	18.25	0.07
	) Camelopardalis .	E.	7	20 42 42.80	+0.51	+0.21	—2.39	+1.78	+0.01	42.92	3 38 1.01	+6 55 [18.09]	. .

$a' = +0^s.42$ (circle W.); $a'' = +0^s.82$ (circle E.); $c = 0^s.56$ (+ with circle E.).
Chronometer No. 1295, at $19^h\ 39^m$ chron. time, $6^h\ 55^m\ 18^s.18 \pm 0^s.01$ slow, losing $0^s.01$ per hour.
$19^h\ 33^m$ $6^h\ 55^m\ 18^s.18$

. 12	07 Ceti	E.	7	19 15 47.10	+0.55	—0.28	+0.09	+0.48	—0.01	47.93	2 11 7.54	+6 55 19.61	0.02
	η Persei	.	7	19 46 48.87	+0.57	—0.26	—0.88	+0.84	—0.01	49.13	2 42 9.02	[19.89]	. .
	σ Arietis	.	7	19 49 40.36	+0.55	—0.22	—0.15	+0.49	—0.01	41.02	2 45 0.71	19.69	0.06
	τ Persei	.	3	19 50 36.70	+0.57	—0.19	—0.79	+0.78	—0.01	37.07	2 45 56.90	[19.83]	. .
	η Eridani	.	7	19 55 21.05	+0.55	—0.16	+0.12	+0.49	0.00	22.05	2 50 41.60	19.55	0.08
	ϵ Arietis	.	7	19 57 9.85	+0.55	—0.14	—0.22	+0.51	0.00	10.53	2 52 30.07	19.54	0.09
	γ Persei	.	7	20 0 58.57	+0.57	—0.11	—0.81	+0.80	0.00	59.02	2 56 18.56	[19.54]	. .
	δ Arietis	E.	7	20 9 34.83	+0.55	—0.08	—0.20	+0.51	0.00	35.61	3 4 55.08	6 55 19.47	0.16
	λ Tauri	W.	7	20 58 52.27	—0.55	—0.13	+0.12	—0.54	0.00	51.17	3 54 10.78	6 55 19.61	0.02
	ν Tauri	.	7	21 1 36.37	—0.55	—0.05	—0.04	—0.52	0.00	35.21	3 56 54.90	19.69	0.06
	π^5 Orionis	W.	7	21 52 49.93	—0.55	+0.03	—0.01	—0.52	+0.01	48.94	4 48 8.48	6 55 19.54	0.09

$a' = +0^s.62$ (circle E.); $a'' = +0^s.62$ (circle W.); $c = 0^s.48$ (+ with circle E.).
Chronometer No. 1295, at $20^h\ 33^m$ chron. time, $6^h\ 55^m\ 19^s.63 \pm 0^s.026$ slow, losing $0^s.009$ per hour.
$19^h\ 30^m$ $6^h\ 55^m\ 19^s.62$

Transits of stars observed at Cape Saint James, Cochin China, by Lieut. Commander C. H. Davis, U. S. N., to determine the correction of sidereal chronometer Negus 1254.

Date.	Name of Star.	Circle.	No. of threads.	Transit over mean of threads.	Flexure.	Level.	Azimuth.	Aberration and collimation.	Rate.	Seconds of corr. transit.	R. A.	Chron. correction.	r.
				h. *m.* *s.*	*s.*	*s.*	*s.*	*s.*	*s.*	*s.*	*h.* *m.* *s.*	*h.* *m.* *s.*	*s.*
1881.													
Dec. 6	ϕ Aquarii	W.	7	15 58 56.84	−0.52	0.00	+ 3.10	−0.32	−0.04	59.06	23 8 13.43	+7 9 14.37	0.05
	γ Piscium	.	7	16 1 48.76	−0.54	−0.01	+ 1.41	−0.32	−0.03	49.27	23 11 3.66	14.39	0.03
	o Cephei	.	7	16 4 58.84	−0.76	−0.02	−23.05	−0.83	−0.03	34.15	23 13 48.47	[14.32]	. .
	4 Cassiopeæ	.	7	16 10 41.54	−0.71	−0.03	−17.28	−0.67	−0.02	22.83	23 19 37.31	[14.48]	. .
	κ Piscium	.	7	16 11 38.46	−0.53	−0.03	+ 1.78	−0.32	−0.02	39.54	23 20 53.82	14.48	0.06
	θ Piscium	.	7	16 12 45.50	−0.54	−0.03	+ 0.85	−0.32	−0.02	45.44	23 21 59.82	14.38	0.04
	70 Pegasi	W.	7	16 13 58.92	−0.55	−0.03	− 0.34	−0.33	−0.02	57.65	23 23 12.14	14.49	0.07
	ι Piscium	E.	7	16 24 37.56	+0.54	−0.16	+ 1.02	+0.28	0.00	39.24	23 33 53.82	14.58	0.16
	γ Cephei	.	7	16 26 0.66	+0.95	−0.28	−44.04	+1.23	0.00	18.52	23 34 33.15	[14.63]	. .
	41 H. Cephei	.	7	16 33 26.14	+0.76	−0.22	−23.30	+0.71	+0.01	4.10	23 42 18.31	[14.24]	. .
	ϕ Pegasi	.	7	16 37 16.76	+0.56	−0.16	− 1.61	+0.29	+0.02	15.84	23 46 30.22	14.38	0.04
	ω Piscium	.	7	16 44 0.39	+0.54	−0.13	+ 0.78	+0.28	+0.03	1.89	23 53 16.20	14.31	0.11
	33 Piscium	.	7	16 50 0.59	+0.52	−0.11	+ 3.13	+0.28	+0.03	4.44	23 59 18.78	14.34	0.08
	γ Pegasi	E.	7	16 57 56.37	+0.56	−0.13	− 0.81	+0.29	+0.04	56.32	0 7 10.81	14.49	0.07

$a' = +10^s.516$ (circle W.); $a'' = +10^s.808$ (circle E.); $c = 0^s.298$ (+ with circle E.).
Chronometer No. 1254, at $16^h\ 25^m$ chron. time, $7^h\ 9^m\ 14^s.42 \pm 0^s.018$ slow, losing $0^s.082$ per hour.
$19^h\ 33^m$ $7^h\ 9^m\ 14^s.68$

Date.	Name of Star.	Circle.	No. of threads.	Transit over mean of threads.	Flexure.	Level.	Azimuth.	Aberration and collimation.	Rate.	Seconds of corr. transit.	R. A.	Chron. correction.	r.
				h. *m.* *s.*	*s.*	*s.*	*s.*	*s.*	*s.*	*s.*	*h.* *m.* *s.*	*h.* *m.* *s.*	*s.*
Dec. 10	41 H. Cephei	W.	4	16 32 56.74	−0.76	+0.13	+ 1.13	−1.32	− 0.16	55.76	23 42 18.15	+7 9 [22.39]	. .
	ϕ Pegasi	.	3	16 37 8.75	−0.56	+0.10	+ 0.08	−0.54	−0.15	7.68	23 46 30.17	22.49	0.08
	ω Piscium	.	7	16 43 54.97	−0.54	+0.09	− 0.04	−0.52	− 0.14	53.82	23 53 16.16	22.34	0.07
	Groom. 29	.	1	17 0 15.65	−0.93	+0.15	+ 2.02	−2.17	− 0.12	14.60	0 9 30.31	[21.71]	. .
	κ Cassiopeæ	.	2	17 16 58.04	−0.72	+0.12	+ 0.89	−1.11	−0.10	57.12	0 26 20.28	[23.16]	. .
	21 Cassiopeæ	.	7	17 28 34.87	−0.88	+0.17	− 1.74	−1.91	−0.08	33.91	0 37 55.09	[22.08]	. .
	δ Piscium	W.	7	17 33 13.65	−0.54	+0.11	− 0.03	−0.52	−0.08	12.59	0 42 34.95	22.36	0.05
	γ Cassiopeæ	E.	7	17 40 12.99	+0.70	0.00	+ 0.88	+0.95	−0.07	15.45	0 49 38.07	[22.62]	. .
	ϵ Piscium	.	7	17 47 27.24	+0.54	+0.10	− 0.03	+0.48	−0.06	28.27	0 56 50.56	22.29	0.12
	δ Arietis	.	6	19 55 31.12	+0.56	+0.08	+ 0.10	+0.50	+0.12	32.48	3 4 55.08	22.60	0.19
	o Tauri	.	7	20 9 6.11	+0.55	+0.16	− 0.02	+0.48	+0.14	7.42	3 18 29.87	22.45	0.04
	ξ Tauri	.	7	20 11 24.83	+0.55	+0.17	− 0.01	+0.48	+0.14	26.16	3 20 48.54	22.38	0.03
	f Tauri	.	7	20 14 59.87	+0.55	+0.19	+ 0.02	+0.48	+0.15	1.26	3 24 23.64	22.38	0.03
	Groom. 716 . . .	.	6	20 22 34.44	+0.72	+0.30	+ 1.00	+1.03	+0.16	37.65	3 31 59.84	[22.19]	. .
	γ Camelop., H . . .	E.	7	20 28 34.26	+0.81	+0.38	+ 1.54	+1.45	+0.17	38.61	3 38 1.00	[22.39]	. .

$a' = -0^s.523$ (circle W.); $a'' = -0^s.577$ (circle E.); $c = 0^s.493$ (+ with circle E.).
Chronometer No. 1254, at $18^h\ 28^m$ chron. time, $7^h\ 9^m\ 22^s.41 \pm 0^s.023$ slow, losing $0^s.083$ per hour.
$18^h\ 25^m$ $7^h\ 9^m\ 22^s.41$

Transits of stars observed at Cape Saint James, Cochin China, by Lieut. Commander C. H. Davis, U. S. N., to determine the correction of sidereal chronometer Negus 1254.

Date.	Name of Star.	Circle.	No. of threads.	Transit over mean of threads.	Flexure.	Level.	Azimuth.	Aberration and collimation.	Rate.	Seconds of corr. transit.	R. A.	Chron. correction.	*v.*
1881.				*h.* *m.* *s.*	*s.*	*s.*	*s.*	*s.*	*s.*	*s.*	*h.* *m.* *s.*	*h.* *m.* *s.*	*s.*
Dec. 18	33 Piscium	W.	5	16 49 43.28	—0.52	+0.06	— 0.28	—0.75	—0.06	41.73	23 59 18.64	+7 9 36.91	0.01
	γ Pegasi	.	7	16 57 34.79	—0.56	+0.08	+ 0.07	—0.75	—0.05	33.58	0 7 10.68	37.10	0.18
	ι Ceti	.	7	17 3 50.59	—0.51	+0.09	— 0.33	—0.75	—0.04	49.05	0 13 25.90	36.85	0.07
	44 Piscium	.	7	17 9 46.64	—0.53	+0.06	— 0.15	—0.74	—0.04	45.24	0 19 22.28	37.04	0.12
	12 Ceti	.	7	17 14 26.67	—0.52	+0.10	— 0.25	—0.75	—0.03	25.22	0 24 2.06	36.84	0.08
	κ Cassiopeæ	.	7	17 16 43.33	—0.72	+0.17	+ 1.63	—1.60	—0.03	42.78	0 26 20.02	[37.24]	. .
	21 Cassiopeæ	.	7	17 28 19.92	—0.88	+0.05	+ 3.22	— 2.76	—0.01	19.54	0 37 55.50	[35.96]	. .
	Borealis 82 . . .	W.	7	17 34 0.75	—0.73	0.00	+ 1.74	—1.67	0.00	0.09	0 43 36.77	[36.68]	. .
	γ Cassiopeæ	E.	7	17 39 57.52	+0.70	—0.04	+ 1.56	+1.41	0.00	1.15	0 49 37.84	[35.62]	. .
	43 H. Cephei	.	2	17 43 0.78	+1.80	— 0.15	+12.91	+9.21	+0.01	24.56	0 53 1.05	[36.39]	. .
	ε Piscium	.	7	17 47 12.45	+0.54	— 0.06	— 0.05	+0.71	+0.01	13.60	0 56 50.49	36.89	0.03
	ζ Piscium	.	7	18 2 6.14	+0.54	0.00	— 0.13	+0.70	+0.03	7.28	1 11 44.11	36.83	0.09
	μ¹ Ceti	.	7	18 8 30.99	+0.52	+0.03	— 0.34	+0.71	+0.04	31.95	1 18 8.85	36.90	0.02
	ν Piscium	.	7	18 25 40.77	+0.54	+0.05	— 0.10	+0.70	+0.06	42.02	1 35 18.96	36.94	0.02
	ε Cassiopeæ	.	7	18 36 17.27	+0.72	+0.09	+ 1.79	+1.55	+0.07	21.49	1 45 58.19	[36.30]	. .
	ξ Piscium	E.	7	18 37 50.29	+0.54	+0.06	— 0.14	+0.70	+0.07	51.52	1 47 28.40	36.88	0.04

$a' = -0^{m}.965$ (circle W.); $a'' = -1^{s}.017$ (circle E.); $c = 0^{s}.723$ (+ with circle E.).

Chronometer No. 1254, at $17^{h}\ 38^{m}$ chron. time, $7^{h}\ 9^{m}\ 36^{s}.92 \pm 0^{s}.019$ slow, losing $0^{s}.074$ per hour.

$18^{h}\ 54^{m}$ $7^{h}\ 9^{m}\ 37^{s}.01$

Transits of stars observed at Hong-Kong, China, by Lieut. John A. Norris, U. S. N., to determine the correction of sidereal chronometer Negus 1178.

Date.	Name of Star.	Circle.	No. of threads.	Transit over mean of threads.	Flexure.	Level.	Azimuth.	Aberration and collimation.	Rate.	Seconds of corr. transit.	R. A.	Chron. correction.	r.
				h. *m.* *s.*	*s.*	*s.*	*s.*	*s.*	*s.*	*s.*	*h.* *m.* *s.*	*h.* *m.* *s.*	*s.*
1881.													
Dec. 10	μ Pegasi	E.	7	15 0 52.79	+0.30	+0.08	−0.01	−0.13	−0.02	53.01	22 44 19.15	+7 43 26.14	0.04
	α Pegasi	.	7	15 15 27.42	+0.28	+0.05	+0.03	−0.12	−0.02	27.64	22 58 53.72	26.08	0.02
	π Cephei	.	7	15 20 44.20	+0.64	+0.09	−0.75	−0.46	−0.02	43.70	23 4 9.93	[26.23]	. .
	o Cephei	.	7	15 30 22.34	+0.51	+0.05	−0.46	−0.31	−0.01	22.12	23 13 48.28	[26.16]	. .
	τ Pegasi	.	7	15 31 22.36	+0.30	+0.03	0.00	−0.13	−0.01	22.55	23 14 48.68	26.13	0.03
	ν Pegasi	.	7	15 36 3.99	+0.30	+0.03	0.00	−0.13	−0.01	4.18	23 19 30.28	26.10	0.00
	θ Piscium	.	7	15 38 33.45	+0.26	+0.03	+0.07	−0.12	−0.01	33.68	23 21 59.78	26.10	0.00
	70 Pegasi	.	7	15 39 45.85	+0.28	+0.03	+0.04	−0.12	−0.01	46.07	23 23 12.09	26.02	0.08
	γ Cephei	E.	7	15 51 7.65	+0.71	+0.09	−0.90	−0.53	0.00	7.02	23 34 32.81	[25.79]	. .
	ϕ Pegasi	W.	7	16 3 4.58	−0.29	−0.23	−0.01	+0.09	0.00	4.14	23 46 30.17	26.03	0.07
	ω Piscium	.	7	16 9 50.50	−0.27	−0.18	−0.04	+0.08	0.00	50.09	23 53 16.16	26.07	0.03
	α Andromedæ . . .	.	7	16 18 52.91	−0.31	−0.19	+0.02	+0.09	+0.01	52.53	0 2 18.60	26.07	0.03
	12 Ceti	.	7	16 40 36.42	−0.25	−0.14	−0.07	+0.08	+0.02	36.06	0 24 2.15	26.09	0.01
	ϵ Andromedæ . . .	.	7	16 48 54.93	−0.31	−0.17	+0.02	+0.09	+0.02	54.58	0 32 20.74	26.16	0.06
	21 Cassiopeæ	.	7	16 54 30.33	−0.63	−0.35	+0.44	+0.30	+0.02	30.11	0 37 55.99	[25.88]	. .
	32[1] Camelop, H. S. P.	.	7	17 4 45.73	+0.74	+0.41	−1.41	−1.16	+0.02	44.33	12 48 9.05	[24.72]	. .
	43 Cephei	.	6	17 9 34.44	−1.62	−0.89	+1.78	+1.08	+0.03	34.82	0 53 2.94	[26.12]	. .
	ϵ Piscium	W.	7	17 13 24.72	−0.27	−0.15	−0.04	+0.08	+0.03	24.37	0 56 50.56	26.19	0.09

$a' = +0^s.248$ (circle E.); $a'' = -0^s.152$ (circle W.); $c = 0^s.101$ (— with circle E.).

Chronometer No. 1178, at $16^h\ 0^m$ chron. time, $7^h\ 43^m\ 26^s.10 \pm 0^s.010$ slow, losing $0^s.023$ per hour.

$18^h\ 19^m$ $7^h\ 43^m\ 26^s.15$

Dec. 11	η Pegasi	W.	7	14 54 2.49	−0.31	−0.08	+0.02	+0.05	−0.02	2.15	22 37 28.88	+7 43 26.73	0.06
	λ Pegasi	.	7	14 57 25.06	−0.30	−0.06	0.00	+0.05	−0.02	24.73	22 40 51.47	26.74	0.07
	ι Cephei	.	7	15 2 3.09	−0.48	−0.07	+0.26	+0.11	−0.02	2.89	22 45 29.40	[26.51]	. .
	β Pegasi	.	7	15 14 37.61	−0.31	−0.01	+0.02	+0.05	−0.01	37.35	22 58 4.00	26.65	0.02
	α Pegasi	.	7	15 15 27.37	−0.28	−0.01	−0.02	+0.05	−0.01	27.10	22 58 53.70	26.60	0.07
	π Cephei	.	7	15 20 42.96	−0.64	0.00	+0.46	+0.18	−0.01	42.95	23 4 9.85	[26.90]	. .
	o Cephei	.	7	15 30 21.71	−0.51	+0.02	+0.29	+0.12	−0.01	21.62	23 13 48.23	[26.61]	. .
	τ Pegasi	.	7	15 31 22.27	−0.30	+0.01	0.00	+0.05	−0.01	22.02	23 14 48.67	26.65	0.02
	ν Pegasi	W.	7	15 36 3.84	−0.30	+0.02	0.00	+0.05	0.00	3.61	23 19 30.27	26.66	0.01
	γ Cephei	E.	7	15 51 6.04	+0.71	+0.52	−0.91	−0.38	0.00	5.98	23 34 32.72	[26.74]	. .
	ϕ Pegasi	.	7	16 3 3.04	+0.29	+0.17	+0.02	−0.09	+0.01	3.44	23 46 30.16	26.72	0.05
	ω Piscium	.	7	16 9 48.99	+0.27	+0.15	+0.07	−0.09	+0.01	49.40	23 53 16.15	26.75	0.08
	33 Piscium	.	7	16 15 51.69	+0.24	+0.14	+0.12	−0.09	+0.01	52.11	23 59 18.72	26.61	0.06
	α Andromedæ . . .	.	7	16 18 51.46	+0.31	+0.18	−0.03	−0.10	+0.01	51.83	0 2 18.59	26.76	0.09
	4 Draconis, S. P. .	.	7	16 23 10.22	−0.25	−0.14	+1.21	+0.23	+0.02	11.29	12 6 37.88	[26.59]	. .
	44 Piscium	.	7	16 35 55.40	+0.26	+0.15	+0.09	−0.08	+0.02	55.84	0 19 22.36	26.52	0.15
	21 Cassiopeæ	.	7	16 54 29.61	+0.63	+0.37	−0.73	−0.32	+0.03	29.59	0 37 55.93	[26.34]	. .
	ζ Andromedæ . . .	E.	7	16 57 39.46	+0.30	+0.17	−0.01	−0.09	+0.03	39.86	0 41 6.54	26.68	0.01

$a' = -0^s.154$ (circle W.); $a'' = +0^s.250$ (circle E.); $c = 0^s.066$ (— with circle E.).

Chronometer No. 1178, at $15^h\ 45^m$ chron. time, $7^h\ 43^m\ 26^s.67 \pm 0^s.014$ slow, losing $0^s.025$ per hour.

$18^h\ 33^m$ $7^h\ 43^m\ 26^s.74$

Transits of stars observed at Cape Saint James, Cochin China, by Lieut. Commander C. H. Davis, U. S. N., to determine the correction of sidereal chronometer Negus 1254.

Date.	Name of Star.	Circle.	No. of threads.	Transit over mean of threads.	Flexure.	Level.	Azimuth.	Aberration and collimation.	Rate.	Seconds of corr. transit.	R. A.	Chron. correction.	*v.*
1881.				*h. m. s.*	*s.*	*s.*	*s.*	*s.*	*s.*	*s.*	*h. m. s.*	*h. m. s.*	*s.*
Dec. 11	4 Cassiopeæ	E.	7	16 10 11.84	+0.71	0.00	−1.10	+1.34	−0.05	12.74	23 19 37.13	+7 9 [24.39]	. .
	κ Piscium	.	7	16 11 28.24	+0.53	+0.04	+0.11	+0.64	−0.05	29.51	23 20 53.76	24.25	0.01
	θ Piscium	.	7	16 12 34.18	+0.54	+0.11	+0.05	+0.64	−0.04	35.48	23 21 59.76	24.28	0.04
	70 Pegasi	.	7	16 13 46.57	+0.55	+0.16	−0.02	+0.65	−0.04	47.87	23 23 12.08	24.21	0.03
	γ Cephei	.	7	16 25 7.26	+0.95	+0.25	−2.73	+2.83	−0.03	8.53	23 34 32.72	[24.19]	. .
	41 II. Cephei	.	7	16 32 52.68	+0.76	+0.21	−1.45	+1.64	−0.02	53.82	23 42 18.11	[24.29]	. .
	φ Pegasi	.	7	16 37 4.65	+0.56	+0.16	−0.10	+0.67	−0.01	5.93	23 46 30.16	24.23	0.01
	ω Piscium	E.	7	16 43 50.53	+0.54	+0.16	+0.05	+0.64	0.00	51.92	23 53 16.16	24.24	0.00
	33 Piscium	W.	7	16 49 55.07	−0.52	+0.30	+0.24	−0.68	0.00	54.41	23 59 18.72	24.31	0.07
	γ Pegasi	.	7	16 57 47.41	−0.56	+0.32	−0.06	−0.70	+0.02	46.43	0 7 10.76	24.33	0.09
	Groom. 29	.	7	17 0 18.74	−0.93	+0.54	−3.23	−2.87	+0.02	12.27	0 9 36.23	[23.96]	. .
	ι Ceti	.	7	17 4 2.51	−0.51	+0.30	+0.29	−0.69	+0.02	1.92	0 13 25.98	24.06	0.18
	12 Ceti	.	7	17 14 38.61	−0.52	+0.27	+0.22	−0.68	+0.04	37.94	0 24 2.14	24.20	0.04
	κ Cassiopeæ	.	7	17 16 58.76	−0.72	+0.36	−1.42	−1.46	+0.04	55.56	0 26 20.25	[24.69]	. .
	21 Cassiopeæ	.	7	17 28 37.89	−0.88	+0.45	−2.90	−2.52	+0.06	32.10	0 37 55.93	[23.83]	. .
	δ Piscium	W.	7	17 33 11.51	−0.54	+0.29	+0.05	−0.68	+0.06	10.69	0 42 34.94	24.25	0.01

$a' = +0^s.671$ (circle E.); $a'' = +0^s.840$ (circle W.); $c = 0^s.659$ (+ with circle E.).

Chronometer No. 1254, at $16^h\ 46^m$ chron. time, $7^h\ 9^m\ 24^s.24 \pm 0^s.016$ slow, losing $0^s.082$ per hour.

$18^h\ 39^m$ $7^h\ 9^m\ 24^s.39$

Dec. 12	ε Tauri	W.	7	21 12 20.22	−0.56	+0.13	+0.22	−0.72	−0.03	19.26	4 21 45.94	+7 9 26.68	0.19
	α Tauri	.	7	21 19 45.70	−0.56	+0.17	+0.15	−0.71	−0.02	44.73	4 29 11.31	26.58	0.09
	ν Eridani	.	7	21 21 2.55	−0.52	+0.17	−0.33	−0.68	−0.02	1.17	4 30 27.47	26.30	0.19
	α Camelopardalis .	.	7	21 32 58.11	−0.75	+0.25	+2.84	−1.69	0.00	58.76	4 42 24.48	[25.72]	. .
	ι Tauri	.	7	21 35 5.11	−0.56	+0.19	+0.21	−0.72	0.00	4.23	4 44 30.66	26.43	0.06
	π^h Orionis	.	7	21 38 43.26	−0.54	+0.18	−0.20	−0.68	0.00	42.02	4 48 8.48	26.46	0.03
	10 Camelopardalis .	W.	7	21 43 32.64	−0.70	+0.24	+2.14	−1.37	0.00	32.95	4 52 59.79	[26.84]	. .
	11 Orionis	E.	7	21 48 23.85	+0.56	+0.10	+0.13	+0.66	+0.01	25.31	4 57 51.91	26.60	0.11
	19 II. Camelop. . .	.	5	21 53 39.78	+1.03	+0.12	+7.14	+3.38	+0.02	51.47	5 3 18.14	[26.67]	. .
	β Orionis	.	7	21 59 26.84	+0.52	+0.06	−0.47	+0.65	+0.03	27.63	5 8 54.15	26.52	0.03
	τ Orionis	.	7	22 2 27.52	+0.52	+0.06	−0.44	+0.64	+0.03	28.33	5 11 54.71	26.38	0.11
	17 Camelopardalis .	E.	1	22 9 35.41	+0.72	+0.08	+2.53	+1.41	+0.04	40.19	5 19 6.23	[26.04]	. .

$a' = -1^s.390$ (circle W.); $a'' = -1^s.450$ (circle E); $c = 0^s.661$ (+ with circle E.)

Chronometer No 1254, at $21^h\ 37^m$ chron. time, $7^h\ 9^m\ 26^s.49 \pm 0^s.030$ slow, losing $0^s.078$ per hour.

$19^h\ 30^m$ $7^h\ 9^m\ 26^s.33$

Transits of stars observed at Hong Kong, China, by Lieut. John A. Norris, U. S. N., to determine the correction of sidereal chronometer Negus 1178.

Date.	Name of Star.	Circle.	No. of threads.	Transit over mean of threads.	Flexure.	Level.	Azimuth.	Aberration and collimation.	Rate.	Seconds of corr. transit.	R. A.	Chron. correction.	*v.*
1881.				*h.* *m.* *s.*	*s.*	*s.*	*s.*	*s.*	*s.*	*s.*	*h.* *m.* *s.*	*h.* *m.* *s.*	*s.*
Dec. 12	μ Pegasi	E.	7	15 0 51.38	+0.30	+0.16	−0.01	−0.06	−0.02	51.75	22 44 19.12	+7 43 27.37	0.08
	ι Cephei	.	7	15 2 2.04	+0.48	+0.25	−0.47	−0.13	−0.02	2.15	22 45 29.36	[27.23]	. .
	β Pegasi	.	7	15 14 36.30	+0.31	+0.13	−0.03	−0.06	−0.01	36.64	22 58 3.99	27.35	0.06
	α Pegasi	.	7	15 15 26.02	+0.28	+0.12	+0.04	−0.05	−0.01	26.40	22 58 53.69	27.29	0.00
	π Cephei	.	7	15 20 42.66	+0.64	+0.27	−0.86	−0.20	−0.01	42.50	23 4 9.78	[27.28]	. .
	γ Piscium	.	7	15 27 35.94	+0.26	+0.12	+0.10	−0.05	−0.01	36.36	23 11 3.59	27.23	0.06
	o Cephei	.	7	15 30 20.78	+0.51	+0.24	−0.53	−0.14	−0.01	20.85	23 13 48.18	[27.33]	. .
	τ Pegasi	.	7	15 31 20.98	+0.30	+0.14	−0.00	−0.06	−0.01	21.35	23 14 48.65	27.30	0.01
	ν Pegasi	E.	7	15 36 2.60	+0.30	+0.16	−0.00	−0.06	0.00	3.00	23 19 30.25	27.25	0.04
	γ Cephei	W.	7	15 51 6.39	−0.71	−0.50	+0.33	+0.07	0.00	5.58	23 34 32.64	[27.06]	. .
	41 H. Cephei	.	7	15 58 51.29	−0.49	−0.39	+0.17	+0.04	+0.01	50.63	23 42 18.06	[27.43]	. .
	ϕ Pegasi	.	7	16 3 3.36	−0.29	−0.23	−0.01	+0.02	+0.01	2.86	23 46 30.15	27.29	0.00
	ω Piscium	.	7	16 9 49.28	−0.27	−0.22	−0.03	+0.02	+0.01	48.79	23 53 16.13	27.34	0.05
	γ Pegasi	.	7	16 23 43.90	−0.28	−0.20	−0.01	+0.02	+0.02	43.45	0 7 10.75	27.30	0.01
	Groom. 29	.	7	16 26 9.59	−0.68	−0.45	+0.31	+0.06	+0.02	8.85	0 9 36.16	[27.31]	. .
	44 Piscium	.	7	16 35 55.54	−0.26	−0.15	−0.03	+0.02	+0.02	55.14	0 19 22.35	27.21	0.08
	12 Ceti	W.	7	16 40 35.21	−0.25	−0.14	−0.04	+0.02	+0.02	34.82	0 24 2.13	27.31	0.02

$a' = +0^s.285$ (circle E.); $a'' = -0^s.091$ (circle W.); $c = 0^s.034$ (— with circle E.).

Chronometer No. 1178, at $15^h\,45^m$ chron. time, $7^h\,43^m\,27^s.29 \pm 0^s.010$ slow, losing $0^s.027$ per hour.

$19^h\,39^m$ $7^h\,43^m\,27^s.40$

Date.	Name of Star.	Circle.	No. of threads.	Transit over mean of threads.	Flexure.	Level.	Azimuth.	Aberration and collimation.	Rate.	Seconds of corr. transit.	R. A.	Chron. correction.	*v.*
Dec. 18	70 Pegasi	E.	7	15 39 40.84	+0.28	+0.19	+0.06	−0.28	−0.02	41.07	23 23 11.99	+7 43 30.92	0.07
	72 Pegasi	.	7	15 44 35.77	+0.32	+0.19	−0.05	−0.32	−0.02	35.89	23 28 6.86	30.97	0.02
	γ Cephei	.	7	15 51 2.68	+0.71	+0.36	−1.11	−1.23	−0.02	1.39	23 34 32.12	[30.73]	. .
	ϕ Pegasi	.	7	16 2 58.94	+0.29	+0.13	+0.02	−0.29	−0.01	59.08	23 46 30.07	30.99	0.00
	Groom. 4168	.	7	16 5 37.45	+0.61	+0.28	−0.86	−0.99	−0.01	36.48	23 49 8.04	[31.56]	. .
	ω Piscium	.	7	16 9 44.91	+0.27	+0.12	+0.09	−0.28	−0.01	45.10	23 53 16.07	30.97	0.02
	α Andromedæ	.	7	16 18 47.38	+0.31	+0.15	−0.04	−0.31	−0.01	47.48	0 2 18.50	31.02	0.03
	γ Pegasi	.	7	16 23 39.55	+0.28	+0.14	+0.04	−0.29	−0.01	39.71	0 7 10.68	30.97	0.02
	Groom. 29	E.	7	16 26 6.32	+0.68	+0.34	−1.05	−1.17	−0.01	5.11	0 9 35.70	[30.59]	. .
	ε Andromedæ	W.	7	16 48 49.84	−0.31	−0.19	+0.02	+0.27	0.00	49.63	0 32 20.64	31.01	0.02
	21 Cassiopeæ	.	7	16 54 24.42	−0.63	−0.31	+0.43	+0.89	0.00	24.80	0 37 55.50	[30.70]	. .
	δ Piscium	.	7	16 59 4.06	−0.27	−0.11	−0.04	+0.24	0.00	3.88	0 42 34.87	30.99	0.00
	32^g Camelop., S. P.	.	7	17 4 42.78	+0.74	+0.26	−1.36	−2.68	+0.01	39.75	12 48 10.61	[30.86]	. .
	43 Cephei	.	6	17 9 26.90	−1.62	−0.48	+1.72	+3.15	+0.01	29.68	0 53 1.05	[31.37]	. .
	ε Piscium	.	7	17 13 19.52	−0.27	−0.07	−0.04	+0.24	+0.01	19.39	0 56 50.49	31.10	0.11
	τ Piscium	.	7	17 21 40.52	−0.31	−0.06	+0.02	+0.28	+0.01	40.46	1 5 11.41	30.95	0.04
	υ Piscium	.	7	17 29 29.62	−0.31	−0.05	+0.01	+0.27	+0.02	29.56	1 13 0.55	30.99	0.00
	μ Piscium	W.	7	17 41 40.84	−0.28	−0.04	−0.02	+0.25	+0.02	40.77	1 25 11.75	30.98	0.01

$a' = +0^s.306$ (circle E.); $a'' = +0^s.147$ (circle W.); $c = 0^s.259$ (— with circle E.).

Chronometer No. 1178, at $16^h\,45^m$ chron. time, $7^h\,43^m\,30^s.99 \pm 0^s.009$ slow, losing $0^s.020$ per hour.

$18^h\,48^m$ $7^h\,43^m\,31^s.03$

Transits of stars observed at Madras, India, by Lieut. Commander C. H. Davis, U. S. N., to determine the correction of sidereal chronometer Negus 1254.

Date.	Name of Star.	Circle.	No. of threads.	Transit over mean of threads.	Flexure.	Level.	Azimuth.	Aberration and collimation.	Rate.	Seconds of corr. transit.	R. A.	Chron. correction.	*v.*
1882.				*h. m. s.*	*s.*	*s.*	*s.*	*s.*	*s.*	*s.*	*h. m. s.*	*h. m. s.*	*s.*
Jan. 20	*a* Ceti	W.	7	21 32 52.23	−0.53	+0.28	+0.19	−0.02	−0.14	52.01	2 56 8.31	+5 23 16.30	0.28
	48 Cephei, II. . . .	.	7	21 42 19.95	−1.07	+0.56	−4.64	−0.07	−0.14	14.59	3 5 29.13	[14.54]	. .
	o Tauri	.	7	21 55 14.06	−0.54	+0.23	+0.09	−0.02	−0.13	13.69	3 18 29.62	15.93	0.09
	ξ Tauri	.	7	21 57 32.71	−0.55	+0.22	+0.07	−0.02	−0.12	32.31	3 20 48.30	15.99	0.03
	f Tauri	.	7	21 1 7.85	−0.55	+0.22	+0.01	−0.02	−0.12	7.39	3 24 23.41	16.02	0.00
	e Fridani	.	7	22 4 8.18	−0.50	+0.21	+0 45	−0.02	−0.12	8.20	3 27 23.92	15.72	0.30
	Groom. 716 . . .	.	7	22 8 44.81	−0.76	+0.31	−1.89	−0.04	−0.11	42.35	3 31 59.14	[16.79]	. .
	17 Tauri	W.	7	22 14 38.79	−0.58	+0.24	−0.23	−0.02	−0.11	38.09	3 37 54.28	16.19	0.17
	Groom. 1374. . .	E.	7	2 22 56.07	+0.96	−0.08	−3.28	−0.09	+0.10	53.68	7 46 10.03	[16.35]	. .
	30 Monocerotis . . .	.	7	2 56 31.32	+0.52	0.00	+0.29	−0.02	+0.13	32.24	8 19 48.36	16.12	0.10
	Groom. 1446. . .	.	7	3 3 26.75	+0.95	+0.06	−3.24	−0.09	+0.14	24.57	8 26 40.32	[15.75]	. .
	d Cancri	.	7	3 14 44.68	+0.60	+0.06	−0.10	−0.03	+0.15	45.36	8 38 1.37	16.01	0.01
	e Hydræ	.	7	3 17 17.39	+0.54	+0.06	+0.11	−0.02	+0.15	18.23	8 40 34.18	15.95	0.07
	ξ Hydræ	.	7	3 25 55.03	+0.54	+0.11	+0.12	−0.02	+0.16	55.94	8 49 11.89	15.95	0.07
	a Cancri	E.	7	3 28 47.71	+0.54	+0.13	+0.01	−0.02	+0.16	48.53	8 52 4.55	16.02	0.00

$a' = +1^s.132$ (circle W.); $a'' = +1^s.019$ (circle E.); $c = 0^s.004$ (− with circle E.).

Chronometer No. 1254, at $0^h\ 23^m$ chron. time, $5^h\ 23^m\ 16^s.02 \pm 0^s.031$ slow, losing $0^s.051$ per hour.

$4^h\ 38^m$ $5^h\ 23^m\ 16^s.24$

Jan. 21	48 Cephei, II. . . .	E.	6	21 42 10.13	+1.07	+0.37	−0.05	+0.24	−0.11	11.65	3 5 29.05	+5 23 [17.40]	. .
	o Tauri	.	7	21 55 11.74	+0.54	+0.22	+0.00	+0.05	−0.10	12.45	3 18 29.61	17.16	0.07
	17 Tauri	.	7	22 14 36.11	+0.58	+0.28	−0.00	+0.06	−0.09	36.94	3 37 54.27	17.33	0.10
	η Tauri	.	7	22 17 12.24	+0.58	+0.30	−0.00	+0.06	−0.08	13.10	3 40 30.38	17.28	0.05
	27 Tauri	.	7	22 18 52.92	+0.58	+0.30	−0.00	+0.06	−0.08	53.78	3 42 10.94	17.16	0.07
	9 II. Camelop. . .	.	7	22 23 50.41	+0.74	+0.43	−0.02	+0.11	−9.08	51.59	3 47 8.55	[16.96]	. .
	λ Tauri	E.	7	22 30 52.57	+0.55	+0.29	+0.00	+0.05	−0.07	53.39	3 54 10.62	17.23	0.00
	15 Monocerotis . . .	W.	5	1 11 14.61	−0.55	+0.21	+0.01	−0.09	+0.07	14.26	6 34 31.35	17.09	0.14
	ξ Geminorum . . .	.	7	1 15 25.80	−0.55	+0.21	+0.00	−0.09	+0.07	25.44	6 38 42.60	17.16	0.07
	43 Camelopardalis .	.	7	1 17 48.58	−0.84	+0.32	−0.55	−0.26	+0.07	47.32	6 41 4.46	[17.14]	. .
	ξ Geminorum . . .	.	7	1 33 52.51	−0.57	+0.20	−0.03	−0.10	+0.09	52.10	6 57 9.37	17.27	0.04
	25 Camelopardalis .	.	7	1 43 11.75	−1.47	+0.47	−1.74	−0.72	+0.10	8.39	7 6 25.60	[17.21]	. .
	λ Geminorum . . .	.	7	1 48 4.51	−0.56	+0.17	−0.02	−0.10	+0.10	4.10	7 11 21.38	17.28	0.05
	d Geminorum . . .	W.	7	1 49 50.47	−0.58	+0.17	−0.04	−0.10	+0.10	50.02	7 13 7.33	17.31	0.08

$a' = +0^s.011$ (circle E.); $a'' = +0^s.238$ (circle W.); $c = 0^s.072$ (+ with circle E.).

Chronometer No. 1254, at $23^h\ 54^m$ chron. time, $5^h\ 23^m\ 17^s.23 \pm 0^s.017$ slow, losing $0^s.052$ per hour.

$4^h\ 19^m$ $5^h\ 23^m\ 17^s.46$

Transits of stars observed at Singapore, by Lieut. John A. Norris, U. S. N., to determine the correction of sidereal chronometer Negus 1295.

Date.	Name of Star.	Circle.	No. of threads.	Transit over mean of threads.	Flexure.	Level.	Azimuth.	Aberration and collimation.	Rate.	Seconds of corr. transit.	R. A.	Chron. correction.	v.
1882.				h. m. s.	s.	s.	s.	s.	s.	s.	h. m. s.	h. m. s.	s.
Jan. 20	γ Tauri	W.	7	21 17 48.61	−0.55	+0.04	−0.22	−0.10	0.00	47.78	4 13 6.91	+6 55 19.13	0.01
	δ Tauri	.	7	21 20 51.76	−0.55	+0.05	−0.25	−0.10	0.00	50.91	4 16 10.03	19.12	0.00
	1 Camelopardalis	.	6	21 27 27.32	−0.57	+0.06	−1.17	−0.17	0.00	25.47	4 22 44.67	[19.20]	. .
	α Tauri	.	7	21 33 53.00	−0.55	+0.07	−0.24	−0.10	0.00	52.18	4 29 11.28	19.10	0.02
	ν Eridani	.	7	21 35 8.73	−0.55	+0.07	+0.07	−0.10	0.00	8.22	4 30 27.39	19.17	0.05
	τ Tauri	.	7	21 39 54.07	−0.56	+0.08	−0.35	−0.11	0.00	53.18	4 35 12.18	19.05	0.07
	α Camelopardalis	W.	7	21 47 7.78	−0.58	+0.10	−1.96	−0.24	0.00	5.10	4 42 24.19	[19.09]	. .
	10 Camelopardalis	E.	7	21 57 41.94	+0.57	−0.02	−2.06	+0.11	0.00	40.54	4 52 59.69	[19.15]	. .
	ι Tauri	.	7	22 0 45.65	+0.55	+0.02	−0.44	+0.06	0.00	45.84	4 56 5.04	19.20	0.08
	11 Orionis	.	7	22 2 32.49	+0.55	+0.05	−0.30	+0.06	0.00	32.85	4 57 51.06	19.11	0.01
	δ Aurigæ	.	7	22 54 33.88	+0.57	+0.70	−1.63	+0.10	0.00	33.62	5 49 52.59	[18.97]	. .
	8 Monocerotis	.	7	23 22 13.65	+0.55	+0.07	−0.07	+0.06	0.00	14.26	6 17 33.42	19.16	0.04
	α Argus	.	7	23 26 1.42	+0.53	+0.06	+1.59	+0.09	0.00	3.69	6 21 22.62	[18.93]	. .
	15 Monocerotis	.	7	23 39 11.81	+0.55	+0.02	−0.18	+0.06	0.00	12.26	6 34 31.35	19.09	0.03
	ε Geminorum	.	7	23 41 23.92	+0.55	+0.02	−0.53	+0.06	0.00	24.02	6 36 43.14	19.12	0.00
	ξ Geminorum	.	7	23 43 23.07	+0.55	+0.01	−0.25	+0.06	0.00	23.44	6 38 42.60	19.16	0.04
	18 Monocerotis	.	7	23 46 25.38	+0.55	0.00	−0.03	+0.06	0.00	25.96	6 41 44.99	19.03	0.09
	24 H. Camelop.	E.	6	23 47 44.39	+0.60	0.00	−5.18	+0.25	0.00	40.06	6 42 59.25	[19.19]	. .

$a' = +0^s.875$ (circle W.); $a'' = +1^s.190$ (circle E.); $c = 0^s.077$ (+ with circle E.).

Chronometer No. 1295, at $22^h\ 30^m$ chron time, $6^h\ 55^m\ 19^s.12 \pm 0^s.010$ slow, gaining $0^s.003$ per hour.

$4^h\ 36^m$ $6^h\ 55^m\ 19^s.10$

Jan. 21	δ Orionis	E.	7	22 30 41.32	+0.55	+0.09	+0.00	−0.03	0.00	41.91	5 26 0.97	+6 55 19.06	0.00
	α Leporis	.	7	22 32 13.93	+0.55	+0.09	+0.05	−0.03	0.00	14.59	5 27 33.72	19.13	0.07
	φ^1 Orionis	.	7	22 33 3.34	+0.55	+0.09	−0.02	−0.03	0.00	3.93	5 28 22.95	19.02	0.04
	θ^1 Orionis	.	7	22 34 11.26	+0.55	+0.08	+0.02	−0.03	0.00	11.88	5 29 30.90	19.02	0.04
	σ Orionis	.	7	22 37 31.92	+0.55	+0.08	+0.01	−0.03	0.00	32.53	5 32 51.60	19.07	0.01
	κ Orionis	.	7	22 46 52.11	+0.55	+0.06	+0.03	−0.03	0.00	52.72	5 42 11.84	19.12	0.06
	δ Doradus	.	7	22 49 16.94	+0.52	+0.05	+0.35	−0.07	0.00	17.79	5 44 36.64	[18.85]	. .
	δ Aurigæ	E.	7	22 54 33.31	+0.57	+0.04	−0.21	−0.05	0.00	33.66	5 49 52.58	[18.92]	. .
	γ Geminorum	W.	7	23 35 37.76	−0.55	+0.13	−0.02	−0.01	0.00	37.31	6 30 56.36	19.05	0.01
	15 Monocerotis	.	7	23 39 12.72	−0.55	+0.14	−0.01	−0.01	0.00	12.29	6 34 31.35	19.06	0.00
	ε Geminorum	.	7	23 41 24.57	−0.55	+0.14	−0.04	−0.02	0.00	24.10	6 36 43.14	19.04	0.02
	ξ Geminorum	.	7	23 43 23.97	−0.55	+0.14	−0.02	−0.01	0.00	23.53	6 38 42.60	19.07	0.01
	24 H. Camelop.	.	7	23 47 41.54	−0.60	+0.16	−0.36	−0.06	0.00	40.68	6 42 59.24	[18.56]	. .
	ζ Geminorum	.	7	0 1 50.81	−0.55	+0.16	−0.03	−0.01	0.00	50.38	6 57 9.37	18.99	0.07
	γ^2 Volantis	.	6	0 14 29.94	−0.52	+0.13	+0.23	−0.04	0.00	29.74	7 9 48.69	[18.95]	. .
	δ Geminorum	.	7	0 17 48.77	−0.56	+0.12	−0.06	−0.02	0.00	48.25	7 13 7.33	19.08	0.02
	Piazzi vii, 67	W.	7	0 23 22.90	−0.55	+0.04	−0.21	−0.04	0.00	22.14	7 18 41.48	[19.34]	. .

$a' = +0^s.154$ (circle E.); $a'' = +0^s.083$ (circle W.); $c = 0^s.007$ (− with circle E.).

Chronometer No. 1295 at $23^h\ 15^m$ chron. time, $6^h\ 55^m\ 19^s.06 \pm 0^s.008$ slow, gaining $0^s.001$ per hour.

$4^h\ 18^m$ $6^h\ 55^m\ 19^s.05$

Transits of stars observed at Madras, India, by Lieut. Commander C. H. Davis, U. S. N., to determine the correction of sidereal chronometer Negus 1254.

Date.	Name of Star.	Circle.	No. of threads.	Transit over mean of threads.			Flexure.	Level.	Azimuth.	Aberration and collimation.	Rate.	Seconds of corr. transit.	R. A.			Chron. correction.			n.
1882.				*h.*	*m.*	*s.*	*s.*	*s.*	*s.*	*s.*	*s.*	*s.*	*h.*	*m.*	*s.*	*h.*	*m.*	*s.*	*s.*
Jan. 23	Groom. 848 . . .	F.	7	23	9	43.75	+1.01	+0.38	−0.15	+0.34	−0.09	45.24	4	33	5.39	+5	23	[20.15]	. .
	τ Tauri	.	7	23	11	51.55	+0.58	+0.22	−0.01	+0.09	−0.09	52.34	4	35	12.15			19.81	0.01
	μ Eridani	.	7	23	16	17.63	+0.52	+0.19	−0.01	+0.08	−0.09	18.34	4	39	38.17			19.83	0.01
	a Camelopardalis .	.	7	23	19	3.53	+0.80	+0.29	−0.08	+0.21	−0.08	4.67	4	42	24.10			[19.43]	. .
	t Tauri	.	7	23	21	10.04	+0.57	+0.20	−0.00	+0.09	−0.08	10.82	4	44	30.65			19.83	0.01
	π^6 Orionis	.	7	23	24	47.96	+0.53	+0.19	+0.01	+0.08	−0.08	48.69	4	48	8.45			19.77	0.05
	t Geminorum . . .	E.	7	1	55	5.83	+0.59	+0.31	−0.01	+0.09	+0.06	6.87	7	18	26.75			19.88	0.00
	κ Geminorum . . .	W.	7	2	14	2.66	−0.58	+0.37	+0.06	−0.14	+0.08	2.45	7	37	22.24			19.79	0.03
	β Geminorum . . .	.	7	2	14	49.02	−0.59	+0.38	+0.08	−0.14	+0.08	48.83	7	38	8.01			19.78	0.04
	Groom. 1374 . . .	.	7	2	22	51.25	−0.96	+0.61	+0.87	−0.45	+0.09	51.41	7	46	10.06			[19.65]	. .
	53 Camelopardalis .	.	7	2	28	21.95	−0.74	+0.48	+0.41	−0.25	+0.09	21.94	7	51	41.86			[19.92]	. .
	ζ^1 Cancri	.	7	2	42	9.66	−0.57	+0.33	+0.02	−0.13	+0.11	9.42	8	5	29.38			19.96	0.14
	δ Cancri	W.	7	2	46	50.07	−0.55	+0.35	−0.02	−0.12	+0.11	49.84	8	10	9.56			19.72	0.10

$a' = +0^s.042$ (circle E.); $a'' = -0^s.271$ (circle W.); $c = 0^s.103$ (+ with circle E.).

Chronometer No. 1254, at $0^h\,48^m$ chron. time, $5^h\,23^m\,19^s.82 \pm 0^s.016$ slow, losing $0^s.056$ per hour.

$1^h\,20^m$ $5^h\,23^m\,19^s.85$

Jan. 26	48 Cephei II.	W.	7	21	42	6.70	−1.07	+0.31	−0.60	+0.00	−0.12	5.22	3	5	28.64	+5	23	[23.42]	. .
	ζ Arietis	.	7	21	44	45.47	−0.57	+0.17	−0.02	+0.00	−0.12	44.93	3	8	9.01			24.08	0.03
	f Tauri	.	7	22	0	59.95	−0.55	+0.13	+0.00	+0.00	−0.11	59.42	3	24	23.33			23.91	0.20
	Groom. 716 . . .	.	7	22	8	35.34	−0.76	+0.19	−0.25	+0.00	−0.10	34.42	3	31	58.93			[24.51]	. .
	17 Tauri	.	7	22	14	30.58	−0.58	+0.15	−0.03	+0.00	−0.10	30.02	3	37	54.20			24.18	0.07
	η Tauri	.	7	22	17	6.65	−0.58	+0.15	−0.03	+0.00	−0.09	6.10	3	40	30.31			24.21	0.10
	27 Tauri	W.	7	22	18	47.28	−0.58	+0.15	−0.03	+0.00	−0.09	46.73	3	42	10.87			24.14	0.03
	Piazzi vii, 67 . . .	E.	7	1	55	15.62	+0.84	+0.23	+0.79	−0.11	+0.09	17.46	7	18	41.48			[24.02]	. .
	β Canis Minoris . .	.	7	1	57	23.06	+0.54	+0.10	−0.03	−0.04	+0.09	23.72	7	20	47.71			23.99	0.12
	a Canis Minoris . .	.	7	2	9	45.33	+0.54	+0.12	−0.05	−0.04	+0.10	46.00	7	33	10.05			24.05	0.06
	κ Geminorum . . .	.	7	2	13	57.28	+0.58	+0.14	+0.08	−0.05	+0.10	58.13	7	37	22.25			24.12	0.01
	β Geminorum . . .	.	7	2	14	43.51	+0.59	+0.14	+0.10	−0.05	+0.10	44.39	7	38	8.63			24.24	0.13
	Groom. 1374 . . .	.	7	2	22	43.81	+0.96	+0.17	+1.12	−0.15	+0.11	46.02	7	46	10.09			[24.07]	. .
	χ Geminorum . . .	E.	7	2	32	54.02	+0.59	+0.17	+0.10	−0.05	+0.12	54.95	7	56	19.12			24.17	0.06

$a' = +0^s.147$ (circle W.); $a'' = -0^s.349$ (circle E.); $c = 0^s.021$ (− with circle E.).

Chronometer No. 1254, at $0^h\,10^m$ chron. time, $5^h\,23^m\,24^s.11 \pm 0^s.022$ slow, losing $0^s.050$ per hour.

$23^h\,44^m$ $5^h\,23^m\,24^s.09$

Transits of stars observed at Singapore, by Lieut. John A. Norris, U. S. N., to determine the correction of sidereal chronometer Negus 1295.

Date.	Name of Star.	Circle.	No. of threads.	Transit over mean of threads.	Flexure.	Level.	Azimuth.	Aberration and collimation.	Rate.	Seconds of corr. transit.	R. A.	Chron. correction.	*v.*
1882.				*h.* *m.* *s.*	*s.*	*s.*	*s.*	*s.*	*s.*	*s.*	*h.* *m.* *s.*	*h.* *m.* *s.*	*s.*
Jan. 23	γ Orionis	E.	7	22 23 30.82	+0.55	−0.06	−0.03	−0.02	0.00	31.26	5 18 50.41	+6 55 19.15	0.06
	δ Orionis	.	7	22 30 41.37	+0.55	−0.07	+0.01	−0.02	0.00	41.84	5 26 0.96	19.12	0.03
	α Leporis	.	7	22 32 14.15	+0.55	−0.07	+0.12	−0.03	0.00	14.72	5 27 33.70	18.98	0.11
	ι Orionis	.	7	22 34 22.25	+0.55	−0.07	+0.04	−0.02	0.00	22.75	5 29 41.88	19.13	0.04
	σ Orionis	.	7	22 37 31.96	+0.55	−0.08	+0.02	−0.02	0.00	32.43	5 32 51.58	19.15	0.06
	κ Orionis	.	7	22 46 52.36	+0.55	−0.09	+0.07	−0.02	0.00	52.87	5 42 11.82	18.95	0.14
	δ Aurigæ	.	7	22 54 33.44	+0.57	−0.10	−0.48	−0.04	0.00	33.39	5 49 52.56	[19.17]	. .
	36 Camelopardalis .	.	7	23 5 45.13	+0.58	−0.12	−0.77	−0.06	0.00	44.76	6 1 3.84	[19.08]	. .
	22 Camelopardalis .	E.	7	23 10 37.75	+0.58	−0.13	−0.92	−0.07	0.00	37.21	6 5 56.19	[18.98]	. .
	15 Monocerotis . . .	W.	7	23 39 12.89	−0.55	−0.01	−0.01	−0.02	0.00	12.30	6 34 31.35	19.05	0.04
	ε Geminorum . . .	.	7	23 41 24.61	−0.55	−0.01	−0.03	−0.02	0.00	24.00	6 36 43.14	19.14	0.05
	ξ Geminorum . . .	.	7	23 43 24.06	−0.55	−0.01	−0.01	−0.02	0.00	23.47	6 38 42.60	19.13	0.04
	15 Lyncis	.	7	23 51 49.56	−0.57	−0.02	−0.10	−0.03	0.00	48.84	6 47 7.79	[18.95]	. .
	ζ Geminorum . . .	.	7	0 1 51.00	−0.55	−0.02	−0.02	−0.02	0.00	50.39	6 57 9.38	18.99	0.10
	δ Geminorum . . .	.	7	0 17 48.81	−0.56	−0.03	−0.04	−0.02	0.00	48.16	7 13 7.33	19.17	0.08
	Piazzi vii, 67 . . .	.	7	0 23 23.18	−0.58	−0.03	−0.16	−0.05	0.00	22.36	7 18 41.48	[19.12]	. .
	β Canis Minoris . .	.	7	0 25 29.14	−0.55	−0.03	−0.01	−0.02	0.00	28.53	7 20 47.70	19.17	0.08
	Groom. 1374 . . .	W.	7	0 50 51.68	−0.59	−0.04	−0.22	−0.07	0.00	50.76	7 46 10.06	[19.30]	. .

$a' = +0^s.350$ (circle E.); $a'' = +0^s.061$ (circle W.); $c = 0^s.003$ (— with circle E.).

Chronometer No. 1295, at $23^h\ 15^m$ chron. time, $6^h\ 55^m\ 19^s.09 \pm 0^s.016$ slow, losing $0^s.001$ per hour.

$1^h\ 17^m$ $6^h\ 55^m\ 19^s.10$

Jan. 26	ε Eridani	W.	7	20 32 5.15	−0.55	+0.02	+0.05	+0.10	0.00	4.77	3 27 23.84	+6 55 19.07	0.04
	γ Hydri	.	7	20 53 45.98	−0.50	+0.03	+0.86	+0.37	0.00	46.74	3 49 5.76	[19.02]	. .
	γ Eridani	.	7	20 57 14.40	−0.55	+0.04	+0.06	+0.10	0.00	14.05	3 52 33.16	19.11	0.08
	λ Tauri	.	7	20 58 52.03	−0.58	+0.04	−0.04	+0.10	0.00	51.55	3 54 10.56	19.01	0.02
	ν Tauri	.	7	21 1 36.09	−0.55	+0.04	−0.02	+0.10	0.00	35.66	3 56 54.68	19.02	0.01
	o^1 Eridani	.	7	21 10 49.49	−0.55	+0.07	+0.03	+0.10	0.00	49.14	4 6 8.17	19.03	0.00
	γ Tauri	W.	7	21 17 48.27	−0.55	+0.11	−0.06	+0.10	0.00	47.87	4 13 6.84	18.97	0.06
	π^4 Orionis	E.	7	21 49 38.05	+0.55	−0.09	−0.02	−0.14	0.00	38.35	4 44 57.42	19.07	0.04
	π^5 Orionis	.	7	21 52 49.01	+0.55	−0.07	−0.00	−0.14	0.00	49.35	4 48 8.42	19.07	0.04
	10 Camelopardalis .	.	7	21 57 40.59	+0.57	−0.04	−0.41	−0.28	0.00	40.43	4 52 59.56	[19.13]	. .
	β Eridani	.	7	22 6 45.57	+0.55	+0.01	+0.03	−0.14	0.00	46.02	5 2 5.02	19.00	0.03
	β Orionis	.	7	22 13 34.56	+0.55	+0.05	+0.04	−0.14	0.00	35.06	5 8 54.13	19.07	0.04
	τ Orionis	.	7	22 16 35.21	+0.55	+0.07	+0.03	−0.14	0.00	35.72	5 11 54.70	18.98	0.05
	17 Camelopardalis .	.	7	22 23 47.36	+0.57	+0.11	−0.46	−0.31	0.00	47.27	5 19 6.16	[18.89]	. .
	δ Orionis	E.	7	22 30 41.47	+0.55	+0.14	+0.01	−0.14	0.00	42.03	5 26 0.94	18.90	0.12

$a' = +0^s.234$ (circle W.); $a'' = +0^s.237$ (circle E.); $c = 0^s.118$ (— with circle E.).

Chronometer No. 1295, at $21^h\ 30^m$ chron. time, $6^h\ 55^m\ 19^s.03 \pm 0^s.011$ slow, gaining $0^s.005$ per hour.

$23^h\ 42^m$ $6^h\ 55^m\ 19^s.02$

Transits of stars observed at Madras, India, by Lieut. Commander C. H Davis, U. S. N., to determine the correction of sidereal chronometer Negus 1254.

Date.	Name of Star.	Circle.	No. of threads.	Transit over mean of threads.	Flexure.	Level.	Azimuth.	Aberration and collimation.	Rate.	Seconds of corr. transit.	R. A.	Chron. correction.	*v.*
1882.				*h. m. s.*	*s.*	*s.*	*s.*	*s.*	*s.*	*s.*	*h. m. s.*	*h. m. s.*	*s.*
Jan. 27	48 Cephei II.	E.	7	21 42 4.09	+1.07	+0.56	−3.06	+0.36	−0.08	2.94	3 5 28.45	+5 23 [25.51]	. .
	ζ Arietis	.	7	21 44 42.92	+0.57	+0.30	−0.10	+0.09	−0.08	43.70	3 8 9.00	25.30	0.14
	υ Tauri	.	7	21 55 3.51	+0.54	+0.29	+0.06	+0.08	−0.07	4.41	3 18 29.53	25.12	0.04
	f Tauri	.	7	22 0 57.28	+0.55	+0.29	+0.01	+0.08	−0.07	58.14	3 24 23.32	25.18	0.02
	Groom. 716 . . .	.	7	22 8 33.93	+0.76	+0.40	−1.25	+0.18	−0.06	33.96	3 31 58.89	[24.93]	. .
	17 Tauri	.	7	22 14 28.28	+0.58	+0.30	−0.15	+0.09	−0.06	29.04	3 37 54.18	25.14	0.02
	η Tauri	.	7	22 17 4.44	+0.58	+0.30	−0.15	+0.09	−0.06	5.20	3 40 30.30	25.10	0.06
	27 Tauri	E.	7	22 18 44.96	+0.58	+0.30	−0.15	+0.09	−0.05	45.73	3 42 10.85	25.12	0.04
	η Geminorum . . .	W.	7	0 44 23.03	−0.58	+0.50	−0.17	−0.13	+0.05	22.70	6 7 47.99	25.29	0.13
	μ Geminorum . . .	.	7	0 52 27.13	−0.58	+0.50	−0.17	−0.13	+0.06	26.81	6 15 52.05	25.24	0.08
	8 Monocerotis . . .	.	7	0 54 8.33	−0.54	+0.47	+0.14	−0.12	+0.06	8.34	6 17 33.40	25.06	0.10
	23 II. Camelop. . .	.	7	1 2 55.86	−1.20	+1.02	−4.27	−0.67	+0.06	50.80	6 26 14.93	[24.13]	. .
	γ Geminorum . . .	.	7	1 7 31.40	−0.56	+0.47	−0.06	−0.13	+0.07	31.19	6 30 56.36	25.17	0.01
	15 Monocerotis . . .	.	7	1 11 6.50	−0.55	+0.46	+0.05	−0.12	+0.07	6.41	6 34 31.34	24.93	0.23
	ε Geminorum . . .	.	7	1 13 18.18	−0.58	+0.48	−0.22	−0.13	+0.07	17.80	6 36 43.13	25.33	0.17
	43 Camelopardalis .	W.	7	1 17 42.07	−0.84	+0.69	−2.22	−0.34	+0.08	39.44	6 41 4.40	[24.96]	. .

$a' = +0^s.747$ (circle E.); $a'' = +0^s.957$ (circle W.); $c = 0^s.100$ (+ with circle E.).
Chronometer No. 1254, at $23^h\,33^m$ chron. time, $5^h\,23^m\,25^s.16 \pm 0^s.022$ slow, losing $0^s.043$ per hour.
$0^h\,11^m$ $5^h\,23^m\,25^s.19$

Transits of stars observed at Singapore, by Lieut. John A. Norris, U. S. N., to determine the correction of sidereal chronometer Negus 1295.

Date.	Name of Star.	Circle.	No. of threads.	Transit over mean of threads.	Flexure.	Level.	Azimuth.	Aberration and collimation.	Rate.	Seconds of corr. transit.	R. A.	Chron. correction.	*v.*
1882.				*h. m. s.*	*s.*	*s.*	*s.*	*s.*	*s.*	*s.*	*h. m. s.*	*h. m. s.*	*s.*
Jan. 27	η Eridani	E.	7	19 55 21.78	+0.55	−0.01	+0.08	−0.17	+0.01	22.24	2 50 41.15	+6 55 18.91	0.04
	ε Arietis	.	7	19 57 10.52	+0.55	+0.02	−0.15	−0.18	+0.01	10.77	2 52 29.66	18.89	0.02
	δ Arietis	.	7	20 9 35.52	+0.55	+0.12	−0.13	−0.18	+0.01	35.89	3 4 54.70	18.81	0.06
	ζ Arietis	.	7	20 12 49.76	+0.55	+0.13	−0.14	−0.18	+0.01	50.13	3 8 9.00	18.87	0.00
	2 II. Camelop. . .	.	7	20 24 15.66	+0.57	+0.16	−0.68	−0.34	0.00	15.37	3 19 34.27	[18.90]	. .
	f Tauri	.	7	20 29 4.07	+0.55	+0.16	−0.08	−0.18	0.00	4.52	3 24 23.32	18.80	0.07
	ε Eridani	.	7	20 32 4.28	+0.55	+0.16	+0.08	−0.17	0.00	4.90	3 27 23.83	18.93	0.06
	β Mensæ	.	6	20 38 58.97	+0.54	+0.15	+2.05	−0.88	0.00	0.83	3 34 18.92	[18.09]	. .
	γ Hydri	E.	7	20 53 45.57	+0.50	+0.11	+1.49	−0.65	0.00	47.02	3 49 5.68	[18.66]	. .
	o^1 Eridani	W.	7	21 10 49.71	−0.55	−0.09	+0.06	+0.13	0.00	49.26	4 6 8.16	18.90	0.03
	γ Tauri	.	7	21 17 48.72	−0.55	−0.16	−0.11	+0.13	0.00	48.03	4 13 6.83	18.80	0.07
	δ Tauri	.	7	21 20 51.89	−0.55	−0.18	−0.12	+0.14	0.00	51.17	4 16 9.95	18.78	0.09
	ν Eridani	.	7	21 35 9.02	−0.55	−0.21	+0.04	+0.13	0.00	8.43	4 30 27.31	18.88	0.01
	Groom. 848 . . .	.	7	21 37 47.68	−0.60	−0.23	−1.63	+0.53	0.00	45.75	4 33 5.26	[19.51]	. .
	μ Eridani	.	7	21 44 19.89	−0.55	−0.22	+0.03	+0.13	−0.01	19.27	4 39 38.12	18.85	0.02
	α Camelopardalis .	.	7	21 47 7.29	−0.58	−0.23	−0.94	+0.32	−0.01	5.85	4 42 23.98	[18.13]	. .
	π^6 Orionis	.	7	21 52 50.09	−0.55	−0.22	−0.01	+0.13	−0.01	49.43	4 48 8.41	18.98	0.11
	10 Camelopardalis .	W.	7	21 57 41.70	−0.57	−0.24	−0.72	+0.26	−0.01	40.42	4 52 59.54	[19.12]	. .

$a' = +0^s.407$ (circle E.); $a'' = +0^s.418$ (circle W.); $c = 0^s.151$ (−with circle E.).
Chronometer No. 1295, at $21^h\,0^m$ chron. time, $6^h\,55^m\,18^s.87 \pm 0^s.012$ slow, gaining $0^s.008$ per hour.
$0^h\,9^m$ $6^h\,55^m\,18^s.84$

Differences of longitude, deduced from exchanges of signals.

Place.	Date.	Observer.	Number of time stars.	Position.	Clock errors.	Differences of clock errors.	Number of signals.	Chronometer comparisons.	λ' and λ''.	$\frac{1}{2}(\lambda' + \lambda'')$ Differences of longitude.	σ_0.
					h. m. s.	*m. s.*		*m. s.*	*m. s.*	*m. s.*	*s.*
Yokohama	May 28, 1881	D.	10	E.	9 15 46.53	37 44.04	300	1 23.70	39 7.74	39 7.84	0.10
Nagasaki	May 28, 1881	N.	10	W.	8 38 2.49		300	1 23.90	39 7.94		
Yokohama	June 1, 1881	D.	12	E.	9 15 40.76	37 40.63	300	1 26.92	39 7.55	39 7.60	0.13
Nagasaki	June 1, 1881	G.	10	W.	8 38 0.13		300	1 27.19	39 7.82		
										39 7.77	0.12
Nagasaki	July 22, 1881	D.	10	E.	8 36 16.24	9 39.32	63	1 37.04	8 2.28	8 1.89	0.39
Wladiwostok	July 22, 1881	N.	10	W.	8 45 55.56		65	1 37.83	8 1.49		
Nagasaki	July 23, 1881	D.	12	E.	8 36 18.72	9 36.37	64	1 34.08	8 2.29	8 1.91	0.37
Wladiwostok	July 23, 1881	N.	16	W.	8 45 55.09		64	1 34.83	8 1.54		
										8 1.90	0.38
Wladiwostok	July 17, 1881	N.	12	E.	8 45 58.86	40 35.70	63	59.73	41 35.43	41 34.73	0.70
Shanghai	July 17, 1881	G.	9	W.	8 5 23.16		64	58.33	41 34.03		
Wladiwostok	July 18, 1881	N.	13	E.	8 45 58.23	40 35.29	64	1 0.46	41 35.75	41 34.91	(*)
Shanghai	July 18, 1881	G.	9	W.	8 5 22.94		63	58.78	41 34.07		
										41 34.82	(*)
Nagasaki	July 19, 1881	D.	12	E.	8 36 9.36	30 46.29	63	2 47.00	33 33.29	33 32.92	0.37
Shanghai	July 19, 1881	G.	8	W.	8 5 22.93		65	2 46.26	33 32.55		
Nagasaki	July 21, 1881	D.	10	E.	8 36 14.07	30 50.43	63	2 42.70	33 33.13	33 32.79	0.34
Shanghai	July 21, 1881	G.	10	W.	8 5 23.64		52	2 42.02	33 32.45		
Nagasaki	July 26, 1881	D.	11	E.	8 36 25.59	31 0.41	64	2 32.89	33 33.30	33 32.92	0.38
Shanghai	July 26, 1881	G.	9	W.	8 5 25.18		63	2 32.12	33 32.53		
Nagasaki	July 27, 1881	D.	10	E.	8 36 27.78	31 1.89	64	2 31.31	33 33.20	33 32.79	0.41
Shanghai	July 27, 1881	G.	10	W.	8 5 25.89		65	2 30.49	33 32.38		
										33 32.85	0.37
Shanghai	Sept. 10, 1881	D.	10	E.	8 4 28.92	13 38.04	57	0 3.34	13 41.38	13 40.95	0.42
Amoy	Sept. 10, 1881	N.	12	W.	7 50 50.88		65	0 2.49	13 40.53		
Shanghai	Sept. 11, 1881	D.	10	E.	8 4 31.25	13 39.32	65	0 1.91	13 41.23	13 40.80	0.43
Amoy	Sept. 11, 1881	N.	12	W.	7 50 51.93		65	0 1.04	13 40.30		
										13 40.87	0.42
Shanghai	Sept. 14, 1881	D.	7	E.	8 4 37.59	27 54.64	65	1 23.30	29 17.94	29 17.35	0.59
Hong-Kong	Sept. 14, 1881	G.	9	W.	7 36 42.95		63	1 22.11	29 16.75		
Shanghai	Sept. 24, 1881	D.	9	E.	8 4 49.42	28 3.28	63	1 14.43	29 17.71	29 17.21	0.51
Hong-Kong	Sept. 24, 1881	G.	11	W.	7 36 46.14		65	1 13.42	29 16.70		
										29 17.28	0.55
Amoy	Sept. 10, 1881	N.	12	E.	7 50 50.88	14 9.32	64	1 27.45	15 36.77	15 36.48	0.29
Hong-Kong	Sept. 10, 1881	G.	10	W.	7 36 41.56		63	1 26.87	15 36.19		
Amoy	Sept. 11, 1881	N.	12	E.	7 50 51.93	14 10.00	64	1 26.81	15 36.81	15 36.48	0.33
Hong-Kong	Sept. 11, 1881	G.	9	W.	7 46 41.93		63	1 26.15	15 36.15		
Amoy	Sept. 12, 1881	N.	14	E.	7 50 53.56	14 11.20	65	1 25.51	15 36.71	15 36.38	0.33
Hong-Kong	Sept. 12, 1881	G.	8	W.	7 36 42.36		63	1 24.84	15 36.04		
Amoy	Sept. 16, 1881	N.	11	E.	7 51 1.94	14 18.12	64	1 18.54	15 36.66	15 36.36	0.30
Hong-Kong	Sept. 16, 1881	G.	11	W.	7 36 43.72		64	1 17.94	15 36.06		
										15 36.42	0.31

* Signals transmitted at Nagasaki.

Differences of longitude deduced from exchanges of signals—Continued.

Place.	Date.	Observer.	Number of time stars.	Position.	Clock errors.	Differences of clock errors.	Number of signals.	Chronometer comparisons.	λ' and λ''.	$\frac{1}{2}(\lambda'+\lambda'')$ Differences of longitude.	w.
					h. m. s.	*m. s.*		*m. s.*	*m. s.*	*m. s.*	*s.*
Manila	Oct. 30, 1881	D.	10	E.	8 3 46.47	27 4.82	39	0 8.87	27 13.69	27 13.30	0.39
Hong Kong	Oct. 30, 1881	G.	10	W.	7 36 41.65		37	0 8.08	27 12.90		
Manila	Nov. 1, 1881	D.	7	E.	8 3 50.76	27 10.48	65	0 3.27	27 13.75	27 13.35	0.40
Hong-Kong	Nov. 1, 1881	G.	11	W.	7 36 40.28		65	0 2.47	27 12.95		
Manila	Nov. 2, 1881	D.	10	E.	8 3 52.65	27 13.07	64	+ 0 0.74	27 13.81	27 13.42	0.36
Hong Kong	Nov. 2, 1881	G.	11	W.	7 36 39.58		65	— 0 0.03	27 13.04		
										27 13.36	*0.38
Hong-Kong	Dec. 10, 1881	N.	12	E.	7 43 26.15	34 3.74	62	5 42.82	28 20.92	28 21.41	0.49
Cape Saint James	Dec. 10, 1881	D.	8	W.	7 9 22.41		65	5 41.84	28 21.90		
Hong-Kong	Dec. 11, 1881	N.	12	E.	7 43 26.74	34 2.35	65	5 41.49	28 20.86	28 21.35	0.49
Cape Saint James	Dec. 11, 1881	D.	10	W.	7 9 24.39		62	5 40.51	28 21.84		
Hong-Kong	Dec. 12, 1881	N.	11	E.	7 43 27.42	34 1.07	61	5 40.18	28 20.89	28 21.41	0.52
Cape Saint James	Dec. 12, 1881	D.	8	W.	7 9 26.33		62	5 39.13	28 21.94		
Hong-Kong	Dec. 18, 1881	N.	12	E.	7 43 31.03	33 54.02	65	5 32.98	28 21.04	28 21.54	0.50
Cape Saint James	Dec. 18, 1881	D.	10	W.	7 9 37.01		64	5 31.97	28 22.05		
										28 21.43	0.50
Cape Saint James	Dec. 4, 1881	D.	10	E.	7 9 10.84	13 53.09	63	1 1.21	12 51.88	12 52.32	0.44
Singapore	Dec. 4, 1881	G.	13	W.	6 55 17.75		25	1 0.33	12 52.76		
Cape Saint James	Dec. 5, 1881	D.	10	E.	7 9 12.86	13 55.01	65	1 2.93	12 52.08	12 52.50	0.42
Singapore	Dec. 5, 1881	G.	11	W.	6 55 17.85		63	1 2.08	12 52.93		
Cape Saint James	Dec. 6, 1881	D.	10	E.	7 9 14.68	13 56.50	63	1 4.38	12 52.12	12 52.52	0.40
Singapore	Dec. 6, 1881	G.	10	W.	6 55 18.18		63	1 3.59	12 52.91		
Cape Saint James	Dec. 12, 1881	D.	8	E.	7 9 26.33	14 6.71	65	1 14.78	12 51.93	12 52.36	0.42
Singapore	Dec. 12, 1881	G.	8	W.	6 55 19.62		65	1 13.93	12 52.78		
										12 52.42	0.42
Singapore	Jan. 20, 1882	N.	12	E.	6 55 19.10	1 32 2.86	61	2 21.92	1 34 24.78	1 34 24.66	0.87
Madras	Jan. 20, 1882	D.	11	W.	5 23 16.24		65	2 23.69	1 34 26.55		
Singapore	Jan. 21, 1882	N.	11	E.	6 55 19.05	1 32 1.59	63	2 23.05	1 34 24.64	1 34 25.55	0.91
Madras	Jan. 21, 1882	D.	10	W.	5 23 17.46		65	2 24.88	1 34 26.47		
Singapore	Jan. 23, 1882	N.	12	E.	6 55 19.10	1 31 59.25	62	2 25.48	1 34 24.73	1 34 25.60	0.87
Madras	Jan. 23, 1882	D.	9	W.	5 23 19.85		65	2 27.22	1 34 26.47		
Singapore	Jan. 26, 1882	N.	12	E.	6 55 19.02	1 31 54.93	65	2 29.78	1 34 24.71	1 34 25.66	0.95
Madras	Jan. 26, 1882	D.	10	W.	5 23 24.09		65	2 31.69	1 34 26.62		
Singapore	Jan. 27, 1882	N.	12	E.	6 55 18.84	1 31 53.65	63	2 30.92	1 34 24.57	1 34 25.44	0.87
Madras	Jan. 27, 1882	D.	12	W.	5 23 25.19		64	2 32.66	1 34 26.31		
										1 34 25.58	0.90

*Transmission time between Hong-Kong and Bolinao.

Latitude of observing station, Yokohama, Japan, from zenith telescope observations, Lieut. Commander C. H. Davis, U. S. N., observer.

Date.	Number and catalogue.	Apparent declination.	Half sum of declinations.	Corrections.			Latitude.	ν.
				Micrometer.	Level.	Ref.		
1881.		° ′ ″	° ′ ″	′ ″	″	″	° ′ ″	″
June 12	B. A. C. 5031	+29 36 20.27	+35 25 19.80	+ 1 4.56	−2.77	+0.02	+35 26 21.61	2.00
	5122	41 14 19.34						
	5031	29 36 20.27	35 27 15.90	− 0 50.76	−3.52	−0.02	35 26 21.60	2.01
	5130	41 18 11.53						
	5061	30 2 50.99	35 38 35.16	−12 11.35	−2.26	−0.21	35 26 21.34	2.27
	5122	41 14 19.34						
	5061	30 2 50.99	35 40 31.26	−14 6.67	−3.02	−0.24	35 26 21.33	2.28
	5130	41 18 11.53						
	5098	29 30 55.87	35 22 37.60	+ 3 51.16	−2.26	+0.06	35 26 26.56	2.95
	5122	41 14 19.34						
	5098	29 30 55.87	35 24 33.70	+ 1 55.85	−3.02	+0.03	36 26 26.56	2.95
	5130	41 18 11.53						
	5287	43 29 6.94	35 21 13.78	+ 5 10.66	−3.90	+0.09	35 26 20.63	2.98
	5302	27 13 20.61						
	5319	33 39 44.80	35 13 40.70	+12 48.41	−4.28	+0.22	35 26 25.05	1.44
	5385	36 47 36.59						
June 13	4648	18 59 32.77	35 16 6.42	+10 12.63	+5.03	+0.20	35 26 24.28	0.67
	4684	51 32 40.08						
	5031	29 36 20.48	35 25 20.04	+ 0 56.74	+8.55	+0.02	35 26 25.35	1.74
	5122	41 14 19.60						
	5061	30 2 51.20	35 38 35.40	−12 21.51	+8.55	−0.21	35 26 22.23	1.38
	5122	41 14 19.60						
	5031	29 36 20.48	35 27 16.13	− 0 59.27	+8.55	−0.02	35 26 25.39	1.78
	5130	41 18 11.78						
	5061	30 2 51.20	35 40 31.49	−14 17.56	+8.55	−0.24	35 26 22.24	1.37
	5130	41 18 11.78						
	5098	29 30 56.08	35 22 37.84	+ 3 38.73	+8.55	+0.06	35 26 25.18	1.57
	5122	41 14 19.60						
	5098	29 30 56.08	35 24 33.93	+ 1 42.72	+8.55	+0.03	35 26 25.23	1.62
	5130	41 18 11.78						
	5310	36 58 53.83	35 19 19.44	+ 7 2.67	+1.51	+0.12	35 26 23.74	0.13
	5319	33 39 45.05						
	5310	36 58 53.83	35 34 15.57	− 7 55.36	+2.52	−0.13	35 26 22.60	1.01
	5432	34 9 37.31						
	5385	36 47 36.86	35 13 40.96	+12 34.48	+7.04	+0.21	35 26 22.69	0.92
	5319	33 39 45.05						
	5385	36 47 36.86	+35 28 37.08	− 2 23.55	+8.05	−0.04	+35 26 21.54	2.07
	B. A. C. 5432	+34 9 37.31						

Latitude of observing station, Yokohama, Japan, &c.—Continued.

Date.	Number and catalogue.	Apparent declination.	Half sum of declinations.	Corrections. Micrometer.	Level.	Ref.	Latitude.	r.
1881.		° ′ ″	° ′ ″	′ ″	″	″	° ′ ″	″
June 14	B. A. C. 4610	+31 46 49.65	+35 27 32.98	+ 1 8.05	−2.01	−0.02	+35 26 22.90	0.71
	C. S. 1153	39 8 16.31						
	B. A. C. 4610	31 46 49.65	35 26 23.54	+ 0 1.20	−2.01	0.00	35 26 22.73	0.88
	C. S. 1149	39 5 57.42						
	B. A. C. 4648	18 59 32.90	35 16 6.58	+10 17.51	−1.76	+0.21	35 26 22.54	1.07
	4684	51 32 40.26						
	5031	29 36 20.69	35 25 20.27	+ 1 5.93	0.00	+0.02	35 26 26.22	2.61
	5122	41 14 19.85						
	5031	29 36 20.69	35 27 16.36	− 0 50.36	0.00	−0.01	35 26 25.99	2.38
	5130	41 18 12.02						
	5061	30 2 51.41	35 38 35.63	−12 11.96	0.00	−0.21	35 26 23.46	0.15
	5122	41 14 19.85						
	5061	30 2 51.41	35 40 31.72	−14 8.24	0.00	−0.24	35 26 23.24	0.37
	5130	41 18 12.02						
	5098	29 30 56.30	35 22 38.08	+ 3 47.79	0.00	+0.06	35 26 25.93	2.32
	5122	41 14 19.85						
	5098	29 30 56.30	35 24 34.16	+ 1 51.51	0.00	+0.03	35 26 25.70	2.09
	5130	41 18 12.02						
	5146	18 3 5.48	+35 23 39.22	+ 2 39.46	+2.01	+0.05	+35 26 20.74	2.87
	B. A. C. 5210	+52 44 12.97						
	Mean (29 determinations)						+35 26 23.61	±0.24

Latitude of observing station, Nagasaki, Japan, from zenith telescope observations, Lieut. Commander C. H. Davis, U. S. N., observer.

Date.	Number and catalogue.	Apparent declination.	Half sum of declinations.	Corrections. Micrometer.	Level.	Ref.	Latitude.	r.
1881.		° ′ ″	° ′ ″	′ ″	″	″	° ′ ″	″
July 29	B. A. C. 6223	+24 24 3.46	+32 38 51.62	+5 47.18	−3.52	+0.10	+32 44 35.38	2.45
	6218	40 53 39.77						
	B. A. C. 6223	24 24 3.46	32 45 39.48	−1 4.19	−3.52	−0.02	32 44 31.75	1.18
	C. S. 1527	41 7 15.49						
	B. A. C. 6427	32 25 7.17	32 49 26.20	−4 48.77	−2.01	−0.07	32 44 35.35	2.42
	6429	33 13 45.22						
	6429	33 13 45.22	32 52 48.90	−8 8.29	−9.56	−0.14	32 44 30.91	2.02
	6491	32 31 52.59						
	6429	33 13 45.22	+32 46 27.38	−1 41.08	−9.56	−0.03	+32 44 36.71	3.78
	B. A. C. 6553	+32 19 9.55						

Latitude of observing station at Nagasaki, Japan, &c.—Continued.

Date.	Number and catalogue.	Apparent declinations.	Half sum of declinations.	Corrections. Micrometer.	Level.	Ref.	Latitude.	*v.*
		° ′ ″	° ′ ″	′ ″	″	″	° ′ ″	″
July 29	C. S. 1665	+14 2 49.85	+32 45 50.73	−1 13.04	−4.02	−0.02	+32 44 33.65	0.72
	B. A. C. 6697	51 28 51.61						
	6849	38 10 32.41	32 48 10.48	−3 38.19	−2.26	−0.06	32 44 29.97	2.96
	B. A. C. 6879	27 25 48.54						
July 31	C. S. 1527	41 7 16.06	32 45 40.02	−1 3.01	−4.53	−0.02	32 44 32.46	0.47
	B. A. C. 6223	24 24 3.97						
	6218	40 53 40.36	32 38 52.16	+5 47.52	−4.53	+0.10	32 44 35.25	2.32
	6223	24 24 3.97						
	6427	32 25 7.90	32 49 26.79	−4 48.37	−4.27	−0.08	32 44 34.07	1.14
	6429	33 13 45.68						
	6429	33 13 45.68	32 52 49.48	−8 14.11	−4.02	−0.14	32 44 31.21	1.72
	6491	32 31 53.28						
	6429	33 13 45.68	32 46 27.98	−1 48.90	−4.02	−0.03	32 44 35.03	2.10
	B. A. C. 6553	32 19 10.29						
	C. S. 1665	14 2 50.48	32 45 51.49	−1 10.34	−8.30	−0.02	32 44 32.83	0.10
	B. A. C. 6697	51 28 52.50						
Aug. 1	6218	40 53 40.65	32 38 52.44	+5 40.50	−0.25	+0.10	32 44 32.79	0.14
	6223	24 24 4.23						
	6427	32 25 8.26	32 49 27.08	−4 55.56	−2.01	−0.08	32 44 29.43	3.50
	6429	33 13 45.91						
	6429	33 13 45.91	+32 46 28.28	−1 59.89	+1.76	−0.03	+32 44 30.12	2.81
	B. A. C. 6553	+32 19 10.65						
	Mean (16 determinations)						+32 44 32.93	±0.38

Latitude of observing station, Shanghai, China, from zenith telescope observations, Lieut. Commander C. H. Davis, U. S. N., observer.

Date.	Number and catalogue.	Apparent declination.	Half sum of declinations.	Corrections. Micrometer.	Level.	Ref.	Latitude.	*v.*
1881.		° ′ ″	° ′ ″	′ ″	″	″	° ′ ″	″
Aug. 16	B. A. C. 6534	+31 34 23.24	+31 19 55.60	− 5 19.55	−3.52	−0.09	+31 14 32.44	2.83
	6571	31 5 27.95						
	6810	22 18 50.39	31 11 3.40	+ 3 27.87	−4.53	+0.06	31 14 26.80	2.81
	6857	40 3 16.40						
	6857	40 3 16.40	31 25 9.47	−10 38.73	−4.02	−0.18	31 14 26.54	3.07
	6866	22 47 2.54						
Aug. 19	5828	24 59 0.97	+31 12 8.00	+ 2 22.21	−0.25	+0.04	+31 14 30.00	+0.39
	B. A. C. 5847	+37 25 15.04						

Latitude of observing station, Shanghai, China, &c.—Continued.

Date.	Number and catalogue.	Apparent declination.	Half sum of declinations.	Corrections. Micrometer.	Corrections. Level.	Corrections. Ref.	Latitude.	v.
1881.		° ′ ″	° ′ ″	′ ″	″	″	° ′ ″	″
Aug. 19	6534	+31 34 23.82						
	6571	31 5 28.56	+31 19 56.19	− 5 32.95	+4.02	−0.09	+31 14 27.17	2.44
	6599	37 55 41.06						
	6674	24 25 49.25	31 10 45.16	+ 3 47.09	−0.88	+0.06	31 14 31.43	1.82
	6744	17 12 23.75						
	6754	45 14 58.59	31 13 41.17	+ 0 55.00	−6.04	+0.02	31 14 30.15	0.54
	6810	22 18 50.97						
	6857	40 3 17.18	31 11 4.08	+ 3 25.60	−1.01	+0.06	31 14 28.73	0.88
	6857	40 3 17.18						
	6866	22 47 3.21	31 25 10.20	−10 39.96	−1.51	−0.18	31 14 28.55	1.06
Aug. 20	5647	13 28 18.88						
	5776	48 58 21.58	31 13 20.23	+ 1 8.83	+1.01	+0.02	31 14 30.09	0.48
	5828	24 59 1.07						
	5847	37 25 15.15	31 12 8.11	+ 2 22.68	−0.75	+0.04	31 14 30.08	0.47
	6744	17 12 23.93						
	6754	45 14 58.85	31 13 41.39	+ 0 47.78	+0.25	+0.01	31 14 29.43	0.18
	6758	25 29 37.62						
	6771	37 4 24.90	31 17 1.26	− 2 30.40	−1.26	−0.04	31 14 29.56	0.05
	6810	22 18 51.16						
	6857	40 3 17.44	31 11 4.30	+ 3 25.64	+0.12	+0.06	31 14 30.12	0.51
	6857	40 3 17.44						
	6866	22 47 3.33	31 25 10.38	−10 41.27	−2.01	0.18	31 14 26.92	2.69
	6915	35 39 5.55						
	6940	26 33 29.54	31 6 17.54	+ 8 14.41	+0.75	+0.14	31 14 32.84	3.23
	6915	35 39 5.55						
	B. A. C. 6943	+26 27 38.52	+31 3 22.04	+11 9.50	+0.75	+0.19	+31 14 32.48	2.87
	Mean (17 determinations)						+31 14 29.61	±0.32

Latitude of observing station, Amoy, China, from zenith telescope observations, Lieut. J. A. Norris, U. S. N., observer.

Date.	Number and catalogue.	Apparent declination.	Half sum of declinations.	Corrections. Micrometer.	Corrections. Level.	Corrections. Ref.	Latitude.	v.
1881.		° ′ ″	° ′ ″	′ ″	″	″	° ′ ″	″
Aug. 29	B. A. C. 5900	+20 11 11.78						
	5931	28 29 55.25	+24 20 33.52	+ 5 58.78	− 0.43	+0.10	+24 26 31.97	1.85
	6068	40 2 10.59						
	6142	8 43 23.15	24 22 46.87	+ 3 44.06	+ 1.60	+0.07	24 26 32.60	1.22
	7061	38 3 26.07						
	B. A. C. 7088	+10 54 21.99	+24 28 54.03	− 2 33.09	+16.00	−0.05	+24 26 36.89	3.07

Latitude of observing station, Amoy, China, &c.—Continued.

Date.	Number and catalogue.	Apparent declination.	Half sum of declinations.	Corrections.			Latitude.	v.
				Micrometer.	Level.	Ref.		
1881.		° ′ ″	° ′ ″	′ ″	″	″	° ′ ″	″
Aug. 29	7290	+44 0 54.92	+24 31 34.22	− 5 2.13	+ 0.53	−0.10	+24 26 32.52	1.30
	7318	5 2 13.53						
	7410	23 21 44.22	24 30 58.78	− 4 33.69	+11.10	−0.08	24 26 36.11	2.29
	7444	25 40 13.34						
	7521	39 53 10.85	24 36 42.28	−10 7.39	0.00	−0.20	24 26 34.69	0.87
	7561	9 20 13.71						
	B. A. C. 7607	29 37 40.33	24 27 8.02	− 0 30.09	− 3.41	−0.01	24 26 34.51	0.69
	C. S. 1957	19 16 35.72						
	B. A. C. 7607	29 37 40.33	24 22 17.16	+ 4 19.68	− 3.41	+0.07	24 26 33.50	0.32
	C. S. 1961	19 6 53.98						
	B. A. C. 7693	28 23 36.89	24 23 50.43	+ 2 43.30	+ 1.05	+0.05	24 26 34.83	1.01
	7733	20 24 3.97						
Aug. 30	5900	20 11 11.86	24 20 33.59	+ 6 1.25	− 2.13	+0.10	24 26 32.81	1.01
	5931	28 29 55.32						
	5967	24 23 8.05	24 30 26.23	− 3 52.37	+ 0.96	−0.07	24 26 34.75	0.93
	5999	24 37 44.41						
	6068	40 2 10.70	24 22 46.96	+ 3 46.67	− 2.50	+0.07	24 26 31.20	2.62
	B. A. C. 6142	8 43 23.23						
	C. S. 1614	20 40 13.86	24 33 32.82	− 6 58.27	− 0.21	−0.11	24 26 34.23	0.41
	B. A. C. 6547	28 26 51.79						
	6574	21 21 38.21	24 32 19.22	− 5 43.04	− 1.28	−0.10	24 26 34.80	0.98
	6690	27 43 0.24						
	6771	37 4 27.12	24 18 1.24	+ 8 28.81	+ 2.14	+0.17	24 26 32.36	1.46
	6789	11 31 35.37						
	7061	38 3 26.31	24 28 54.22	− 2 12.72	− 9.18	−0.04	24 26 32.28	1.54
	7088	10 54 22.12						
	7103	34 51 3.72	24 31 11.38	− 4 39.77	+ 1.60	−0.09	24 26 33.12	0.70
	7121	14 11 19.04						
	7149	15 29 58.60	24 30 57.20	− 4 18.41	− 5.17	−0.07	24 26 33.55	0.27
	7204	33 31 58.80						
Sept. 20	6574	21 21 40.26	24 32 21.58	− 5 47.13	− 0.11	−0.10	24 26 34.24	0.42
	6690	27 43 2.90						
Sept. 21	6574	21 21 40.33	24 32 21.66	− 5 46.07	0.51	−0.10	24 26 34.98	1.16
	6690	27 43 2.98						
	6771	37 4 30.66	24 18 3.96	+ 8 29.74	− 2.13	+0.17	24 26 31.74	2.08
	6789	11 31 37.26						
	7290	44 1 0.51	24 31 37.96	− 5 3.78	− 1.49	−0.10	24 26 32.59	1.23
	7318	5 2 15.40						
	7521	39 53 16.63	+24 36 46.38	−10 10.79	+ 0.21	−0.20	+24 26 35.60	1.78
	B. A. C. 7561	+ 9 20 16.12						

Latitude of observing station, Amoy, China, &c.—Continued.

Date.	Number and catalogue.	Apparent declination.	Half sum of declinations.	Corrections. Micrometer.	Corrections. Level.	Corrections. Ref.	Latitude.	v.
1881.		° ′ ″	° ′ ″	′ ″	″	″	° ′ ″	″
Sept. 21	B. A. C. 7607	+29 37 45.25	+24 27 12.38	— 0 39.64	+ 2.13	—0.01	+24 26 34.86	1.04
	C. S. 1957	19 16 39.51						
	B. A. C. 7607	29 37 45.25	24 22 21.52	+ 4 19.13	+ 2.45	+0.07	24 26 34.17	0.35
	C. S. 1961	19 6 57.78						
	B. A. C. 7777	37 9 54.73	24 23 22.91	+ 3 10.29	— 1.49	+0.06	24 26 31.77	2.05
	7796	11 36 51.09						
	7880	39 1 38.41	24 37 22.95	—10 45.38	— 0.85	—0.21	24 26 36.51	2.69
	7908	10 13 7.49						
Sept. 22	7149	15 30 1.35	24 31 0.82	— 4 27.16	+ 0.48	—0.07	24 26 34.07	0.25
	7204	33 32 0.30						
	7290	44 1 0.72	+24 31 38.10	— 5 5.26	+ 0.80	—0.10	+24 26 33.54	0.28
	B. A. C. 7318	+ 5 2 15.47						
	Mean (29 determinations)						+24 26 33.82	±0.19

Latitude of observing station, Manila, Philippine Islands, from zenith telescope observations, Lieut. Commander C. H. Davis, U. S. N., observer.

Date.	Number and catalogue.	Apparent declination.	Half sum of declinations.	Corrections. Micrometer.	Corrections. Level.	Corrections. Ref.	Latitude.	v.
1881.		° ′ ″	° ′ ″	′ ″	″	″	° ′ ″	″
Oct. 29	B. A. C. 223	+16 18 22.64	+14 41 0.72	— 5 31.54	— 8.55	—0.09	+14 35 20.54	3.23
	269	13 3 38.79						
	303	5 1 33.02	14 29 37.31	+ 5 54.23	— 9.56	+0.10	14 35 22.08	1.69
	365	23 57 41.60						
	328	5 1 38.94	14 29 40.27	+ 5 52.56	— 9.56	+0.10	14 35 23.37	0.40
	365	23 57 41.60						
	561	10 27 38.61	14 35 22.18	+ 0 12.00	— 8.05	0.00	14 35 26.13	2.36
	572	18 43 5.75						
	707	19 21 23.24	14 43 1.52	— 7 24.72	—10.06	—0.12	14 35 26.62	2.85
	745	10 4 39.80						
	844	11 57 1.25	14 27 42.80	+ 7 49.51	— 9.56	+0.13	14 35 22.88	0.89
	870	16 58 24.36						
Nov. 2	36	8 10 7.66	16 28 53.38	+ 6 34.30	— 6.29	+0.11	14 35 21.50	2.27
	170	+20 47 39.11						
Nov. 3	7832	— 0 37 14.40	14 29 39.56	+ 5 49.86	— 7.04	+0.10	14 35 22.48	1.29
	7923	+29 36 33.53						
	8052	24 50 9.97	+14 47 17.32	—11 41.65	— 8.55	—0.20	+14 35 26.92	3.15
	B. A. C. 8127	+ 4 44 24.67						

Latitude of observing station, Manila, Philippine Islands, &c.—Continued.

Date.	Number and catalogue.	Apparent declination.	Half sum of declinations.	Corrections.			Latitude.	v.
				Micrometer.	Level.	Ref.		
1881.		° ′ ″	° ′ ″	′ ″	″	″	° ′ ″	″
Nov. 3	B. A. C. 36	+ 8 10 7.66	+14 28 53.42	+ 6 38.47	− 7.79	+0.11	+14 35 24.21	0.44
	170	20 47 39.17						
	303	5 1 32.92	14 29 37.48	+ 5 52.70	− 5.78	+0.10	14 35 24.50	0.73
	365	23 57 42.05						
	328	5 1 38.83	+14 29 40.44	+ 5 49.52	+ 6.04	+0.10	+14 35 24.02	0.25
	B. A. C. 365	+23 57 42.05						
	Mean (12 determinations)						+14 35 23.77	±0.40

Latitude of observing station, Hong-Kong, China, from zenith telescope observations, Lieut. John A. Norris U. S. N., observer.

Date.	Number and catalogue.	Apparent declination.	Half sum of declinations.	Corrections.			Latitude.	v.
				Micrometer.	Level.	Ref.		
1881.		° ′ ″	° ′ ″	′ ″	″	″	° ′ ″	″
Dec. 12	B. A. C. 269	+13 3 38.41	+22 7 3.30	+ 9 51.25	+0.16	+0.17	+22 16 54.88	3.31
	285	31 10 28.19						
	348	20 24 36.82	22 11 10.44	+ 5 47.16	0.00	+0.10	22 16 57.70	0.49
	365	23 57 44.06						
	401	28 7 29.23	22 17 52.48	− 0 55.64	+1.39	−0.01	22 16 58.22	0.03
	439	16 28 15.74						
	556	21 41 29.74	22 20 47.10	− 3 50.38	+2.24	−0.06	22 16 58.90	0.71
	581	23 0 4.45						
Dec. 18	556	21 41 29.71	22 20 47.06	− 3 46.70	+0.27	−0.06	22 17 0.57	2.38
	581	23 0 4.42						
	556	21 41 29.71	22 21 25.54	− 4 25.93	+0.27	−0.08	22 16 59.80	1.61
	593	23 1 21.36						
	556	21 41 29.71	22 17 56.64	− 0 57.33	+0.27	−0.02	22 16 59.56	1.37
	648	22 54 23.56						
Dec. 19	102	15 47 45.12	22 27 1.60	− 9 59.39	−1.87	−0.17	22 17 0.17	1.98
	109	29 6 18.07						
	170	20 47 39.56	22 23 24.02	− 6 23.06	−1.60	−0.11	22 16 59.25	1.06
	178	23 59 8.48						
	269	13 3 38.06	22 7 3.12	+ 9 50.73	+1.76	+0.17	22 16 55.78	2.41
	285	31 10 28.18						
	348	20 24 36.62	22 11 10.28	+ 5 48.98	−3.84	+0.10	22 16 55.52	2.67
	365	23 57 43.95						
	401	28 7 29.23	+22 17 52.37	− 0 49.87	−4.27	−0.01	+22 16 58.22	0.03
	B. A. C. 439	+16 28 15.51						

Latitude of observing station, Hong-Kong, China, &c.—Continued.

Date.	Number and catalogue.	Apparent declination.	Half sum of declinations.	Corrections.		Ref.	Latitude.	ν.
				Micrometer.	Level.			
1881.		° ′ ″	° ′ ″	′ ″	″	″	° ′ ″	″
Dec. 19	B. A. C. 401	+28 7 29.23	+22 28 41.55	−11 36.15	−4.27	0.20	+22 17 0.93	2.74
	477	16 49 53.87						
	556	21 41 29.69	22 20 47.04	− 3 49.52	+1.60	−0.06	22 16 59.06	0.87
	581	23 0 4.40						
	556	21 41 29.69	22 21 25.52	− 4 28.37	+1.60	0.08	22 16 58.07	0.48
	593	23 1 21.34						
	556	21 41 29.69	22 17 56.62	− 0 59.49	+1.17	0.02	22 16 58.28	0.09
	648	22 54 23.56						
Dec. 20	102	15 47 45.05	22 27 1.53	−10 0.39	−1.49	0.17	22 16 59.48	1.29
	109	29 6 18.01						
	170	20 47 39.51	22 23 23.98	− 6 25.53	−0.16	0.11	22 16 58.18	0.01
	178	23 59 8.45						
	170	20 47 39.51	22 12 41.48	+ 4 14.18	−0.16	+0.07	22 16 55.57	2.62
	215	23 37 43.46						
	269	13 3 38.00	22 7 3.08	+ 9 54.27	−1.39	+0.17	22 16 50.13	2.00
	285	31 10 28.17						
	348	20 24 36.58	22 11 10.25	+ 5 45.10	+0.64	+0.09	22 16 56.08	2.11
	365	23 57 43.92						
	401	28 7 20.22	22 17 52.34	− 0 52.79	−1.87	0.02	22 16 57.66	0.53
	439	16 28 15.46						
	401	28 7 29.22	22 28 41.52	−11 38.69	−1.87	0.20	22 17 0.76	2.57
	477	16 49 53.83						
	556	21 41 29.66	22 20 47.02	− 3 48.59	+0.11	0.06	22 16 58.48	0.20
	581	23 0 4.38						
	556	21 41 29.66	22 21 25.50	− 4 27.72	+0.11	0.08	22 16 57.81	0.38
	593	23 1 21.33						
	556	21 41 29.66						
	B. A. C. 648	+22 54 23.54	+22 17 56.60	− 0 58.80	−0.59	0.02	+22 16 57.19	1.00
	Mean (26 determinations)						+22 16 58.19	±0.23

Latitude of observing station, Cape Saint James, Cochin China, from zenith telescope observations, Lieut. Commander C. H. Davis, U. S. N., observer.

Date.	Number and catalogue.	Apparent declination.	Half sum of declinations.	Corrections. Micrometer.	Corrections. Level.	Corrections. Ref.	Latitude.	ν.
		° ′ ″	° ′ ″	′ ″	″	″	° ′ ″	″
1881.								
Nov. 30	B. A. C. 682	+20 39 30.78	+10 15 27.99	+ 5 6.48	+3.52	+0.10	+10 20 38.09	0.20
	729	− 0 8 34.80						
	837	+ 2 44 20.37	10 15 58.50	+ 4 33.70	+4.53	+0.08	10 20 36.81	1.08
	867	17 47 36.62						
	1045	20 19 14.02	10 10 25.90	+10 11.53	+1.01	+0.17	10 20 38.61	0.72
	1112	0 1 37.78						
	1053	20 23 6.97	10 12 22.38	+ 8 14.64	+1.01	+0.14	10 20 38.17	0.28
	1112	0 1 37.78						
Dec. 14	837	2 44 19.15	10 15 57.83	+ 4 48.24	−6.29	+0.08	10 20 39.86	1.97
	867	17 47 36.51						
	837	2 44 19.15	10 17 47.96	+ 2 54.53	−6.29	+0.05	10 20 36.25	1.64
	901	17 51 16.76						
	999	20 36 28.10	10 19 2.15	+ 1 44.46	−8.80	+0.03	10 20 37.84	0.05
	1112	0 1 36.20						
	1034	20 43 20.73	10 22 28.46	− 1 40.95	−8.80	−0.03	10 20 38.68	0.79
	1112	0 1 36.20						
	1045	20 19 14.09	10 10 25.14	+10 24.29	−8.80	+0.17	10 20 40.80	2.91
	1112	0 1 36.20						
Dec. 15	336	19 1 54.17	10 25 31.12	− 4 49.34	−5.03	−0.09	10 20 30.66	1.23
	344	1 49 8.07						
	837	2 44 19.06	10 15 57.78	+ 4 45.70	−4.53	+0.09	10 20 39.04	1.15
	867	17 47 36.49						
	837	2 44 19.06	10 17 47.90	+ 2 51.45	−5.03	+0.05	10 20 34.37	3.52
	901	17 51 16.75						
	999	20 36 28.10	10 19 2.10	+ 1 36.13	−3.52	+0.03	10 20 34.74	3.15
	1112	0 1 36.09						
	1034	20 43 20.73	10 22 28.41	− 1 47.23	−3.27	−0.03	10 20 37.88	0.01
	1112	0 1 36.09						
	1045	20 19 14.10	10 10 25.10	+10 17.64	−3.27	+0.17	10 20 39.64	1.75
	1112	0 1 36.09						
	1053	20 23 7.04	+10 12 21.56	+ 8 21.93	−4.78	+0.14	+10 20 38.85	0.96
	B. A. C. 1112	+ 0 1 36.09						
	Mean (16 determinations)						+10 20 37.89	±0.30

Latitude of observing station, Singapore, from zenith telescope observations, Lieut. John A. Norris, U. S. N., observer.

Date.	Number and catalogue.	Apparent declination.	Half sum of declinations.	Corrections.			Latitude.	r.
				Micrometer.	Level.	Ref.		
1882.		° ′ ″	° ′ ″	′ ″	″	″	° ′ ″	″
Jan. 5	B. A. C. 811	— 0 10 52.56	+1 16 42.40	+ 0 28.56	+2.80	+0.01	+1 17 13.77	0.67
	837	+ 2 44 17.36						
Jan. 11	811	— 0 10 53.06	1 16 41.90	+ 0 29.31	+0.90	+0.01	1 17 12.12	0.98
	837	+ 2 44 16.87						
	844	+11 56 54.61	1 17 22.06	— 0 8.55	—1.90	0.00	1 17 11.61	1.49
	910	— 9 22 10.48						
	844	+11 56 54.61	1 20 39.68	— 3 26.38	—1.70	—0.06	1 17 11.54	1.56
	1013	— 9 15 35.25						
	1087	+12 31 54.88	1 20 10.10	— 3 1.58	+4.20	—0.05	1 17 12.67	0.43
	1100	— 9 51 34.68						
	1087	+12 31 54.88	1 11 0.57	+ 6 7.66	+4.30	+0.10	1 17 12.63	0.47
	1148	—10 9 53.74						
	1272	+17 1 28.52	1 14 36.52	+ 2 37.59	+1.20	+0.05	1 17 15.36	2.26
	1441	-14 32 15.48						
	1272	+17 1 28.52	1 13 0.60	+ 4 13.63	+1.20	+0.08	1 17 15.51	2.41
	1446	— 14 35 27.31						
	1346	+17 15 53.17	1 21 48.84	— 4 37.31	+1.05	—0.08	1 17 12.50	0.60
	1441	--14 32 15.48						
	1346	+17 15 53.17	1 20 12.93	— 3 1.28	+1.05	—0.05	1 17 12.65	0.45
	1446	—14 35 27.31						
	1356	+17 10 12.92	1 18 58.72	— 1 46.30	+1.05	—0.03	1 17 13.44	0.34
	1441	--14 32 15.48						
	1356	+17 10 12.92	1 17 22.80	— 0 10.26	+1.05	0.00	1 17 13.59	0.49
	1446	-14 35 27.31						
	1508	+ 2 18 39.97	1 17 32.76	— 0 21.68	+1.90	—0.06	1 17 12.92	0.18
	1519	+ 0 16 25.55						
	1514	+ 2 14 42.22	1 15 33.88	+ 1 36.59	+1.90	+0.02	1 17 12.39	0.71
	1519	+ 0 16 25.55						
	1545	—12 42 50.54	1 15 43.05	+ 1 30.38	+0.10	+0.03	1 17 13.56	0.46
	1557	+15 14 16.64						
	1545	--12 42 50.54	1 21 56.17	— 4 41.95	+0.35	—0.08	1 17 14.49	1.39
	1591	+15 26 42.81						
	1611	+ 2 43 6.14	1 5 27.98	+11 41.86	+2.15	+0.18	1 17 12.17	0.93
	1657	— 0 32 10.17						
	1611	+ 2 43 6.14	1 6 30.33	+10 40.79	+2.15	+0.16	1 17 13.43	0.33
	1660	— 0 30 5.48						
	1657	— 0 32 10.17	1 13 37.98	+ 3 30.89	+3.30	+0.05	1 17 12.22	0.88
	1700	+ 2 59 26.14						
	1660	— 0 30 5.48	+1 14 40.33	+ 2 29.83	+3.30	+0.04	+1 17 13.50	0.40
	B. A. C. 1700	+ 2 59 26.14						
Mean (20 determinations)							+1 17 13.10	±0.17

RECAPITULATION OF RESULTS.

SINGAPORE.

The latitude of the Singapore station, as determined from twenty observations of pairs of stars, is N. 1° 17′ 13″.10.

	h.	m.	s.
The longitude of the Madras station	5	20	59.42
Telegraphic difference of longitude between the Madras and Singapore stations	1	34	25.58
Longitude of the Singapore station	6	55	25.00

To reduce the position of the station to the positions of neighboring landmarks the following corrections are necessary: For the center of the cathedral tower, +19″.7 to the latitude and −0ˢ.27 to the longitude; for the flagstaff in Fort Canning, +20″.6 to the latitude and −1ˢ.50 to the longitude; for the old observation spot in Fort Fullerton, −1″.7 to the latitude and −0ˢ.01 to the longitude.

Applying these corrections, we have—

Center of Cathedral Tower	Lat. N.	1°	17′	32″.8
	Lon.	6ʰ	55ᵐ	24ˢ.73
	Or in arc	103°	51′	10″.95
Flagstaff, Fort Canning	Lat. N.	1°	17′	33″.7
	Lon.	6ʰ	55ᵐ	23ˢ.50
	Or in arc	103°	50′	52″.5
Old observation spot, Fort Fullerton	Lat. N.	1°	17′	11″.4
	Lon.	6ʰ	55ᵐ	24ˢ.99
	Or in arc	103°	51′	14″.85

NOTE.—In a recent number of the Astronomische Nachrichten, Dr. Oudemans states the results of his measurement in July, 1871, between Singapore and Madras, as placing the flagstaff in Fort Canning 1ʰ 34ᵐ 23ˢ.36 east of the Transit Circle at Madras, with an average wave and armature time of 0ˢ.56. When this measurement was made the Fort Canning flagstaff was 72 feet N., 11° 15′ W. of its present position; making the new flagstaff, by Dr. Oudeman's measurement, 1ʰ 34ᵐ 23ˢ.37 east of the Madras meridian. This differs 0ˢ.71 from our measurement of 1881, when the wave and armature time was found to be 0ˢ.90. These discrepancies may be accounted for as follows: In the measurement of 1871 no chronographs were used, the observations being made by eye and ear without any opportunity of determining the personal equation of the observers, and the chronometers were carried every night for comparison from the observatory at either end of the line to the telegraph office, a distance of four miles at Madras and about three-quarters of a mile at Singapore. In the measurement by Lieutenant-Commander Davis and Lieutenant Norris in 1881, the transits of stars as well as time-signals were recorded on chronographs and the chronometers were never moved from their places, the observatories at Singapore and Madras being in telegraphic communication with each other. Moreover, the personal equation between Lieutenant-Commander Davis and Lieutenant Norris after repeated trials has been proved to be less than 0ˢ.10.

The greater wave and armature time of 1881 is to be accounted for by the use of condensers between the observatories and the cable, and by less battery power being used than in 1871.

BATAVIA.

	h.	m.	s.
The telegraphic difference of longitude between the time-ball station at Batavia and the Government Flagstaff at Singapore[1]	0	11	50.98
Correction to reduce the longitude of the flagstaff to its present position	0	0	0.01
	0	11	50.97
Longitude of Fort Canning flagstaff	6	55	23.50
Longitude of time-ball station	7	7	14.47

Observatory, time-ball station[2]: Lat. S. 6° 7′ 40″.1; Lon. E. 7ʰ 7ᵐ 14ˢ.47; Or in arc 106° 48′ 37″.05

CAPE ST. JAMES.

The latitude of the Cape St. James station, as deduced from sixteen observations of pairs of stars, is N. 10° 20′ 37″.89.

	h.	m.	s.
Telegraphic difference of longitude between the Singapore and Cape St. James stations	0	12	52.42
Longitude of the Singapore station	6	55	25.00
Longitude of the Cape St. James station	7	8	17.42

To reduce the position of the station to that of the light-house, a correction of −46″.6 to the latitude and +2ˢ.24 to the longitude is required.

Applying these corrections, the results are—

Cape St. James Light-House[3]: Lat. N. 10° 19′ 51″.29; Lon. E. 7ʰ 8ᵐ 19ˢ.66; Or in arc 107° 4′ 54″.9

HONG-KONG.

The latitude of the Hong-Kong station, deduced from twenty-six observations of pairs of stars, is N 22° 16′ 58″.19.

	h.	m.	s.
Telegraphic difference of longitude between the Cape St. James and Hong-Kong stations	0	28	21.43
Longitude of the Cape St. James station	7	8	17.42
Longitude of the Hong-Kong station	7	36	38.85

To reduce this position to that of the cathedral a correction of −5″.7 to the latitude and −0ˢ.75 to the longitude of the station is required.

[1] Bepaling van het Lengteverschil van Batavia en Singapore door Dr. J. C. Oudemans. Batavia, 1874.

[2] Netherlands Hydrographic Office.

[3] Assuming the difference of longitude between the observatory at Saigon and Cape St. James Light-House, as determined by French surveyors, 1ᵐ 31ˢ, to be correct, this places the observatory at Saigon in longitude 7ʰ 6ᵐ 48ˢ.66 or in arc 106° 42′ 10″.

Applying these corrections, the result is—

Cathedral tower	Lat. N.	22°	16′	52″.49
	Lon. E.	7h	36m	38s.10
	Or in arc	114°	9′	31″.5

MANILA.

The latitude of the Manila station as determined from twelve observations of pairs of stars is 14° 35′ 23″.77.

	h.	m.	s.
Telegraphic difference of longitude between the Hong-Kong and Manila stations	0	27	13.36
Longitude of the Hong-Kong station	7	36	38.85
Longitude of the Manila station	8	3	52.21

To reduce this position to that of the cathedral a correction of +6″.9 to the latitude and +0s.21 to the longitude is required.

Applying these corrections, the result is—

Dome of cathedral	Lat. N.	14°	35′	30″.67
	Lon. E.	8h	3m	52s.21
	Or in arc	120°	58′	3″.15

AMOY.

The latitude of the Amoy station as deduced from twenty-nine observations of pairs of stars is N. 24° 26′ 33″.82.

	h.	m.	s.
Telegraphic difference of longitude between the Hong-Kong and Amoy stations	0	15	36.42
Longitude of the Hong-Kong station	7	36	38.85
Longitude of the Amoy station	7	52	15.27

To reduce the position of the station to that of the Ku-lang-seu signal staff a correction of +11″.84 to the latitude and +0s.97 to the longitude is required.

Applying these corrections, the result is—

Ku-lang-seu I. signal-staff	Lat. N.	24°	26′	45″.66
	Lon. E.	7h	52m	16s.24
	Or in arc	118°	4′	3″.6

SHANGHAI.

The latitude of the Shanghai station as deduced from seventeen observations of pairs of stars is N. 31° 14′ 29″.61.

	h.	m.	s.
Telegraphic difference of longitude between the Hong-Kong and Shanghai stations	0	29	17.28
Longitude of the Hong-Kong station	7	36	38.85
Longitude of the Shanghai station	8	5	56.13
Difference of longitude between the Amoy and Shanghai stations	0	13	40.87
Longitude of the Amoy station	7	52	15.27
Longitude of the Shanghai station	8	5	56.14

To reduce the position of the station to that of the English consulate flagstaff a correction of + 11″.7 to the latitude and −0ˢ.49 to the longitude is required.

Applying these corrections, the result is—

English consulate flagstaff	Lat. N.	31°	14′	41″.31
	Lon. E.	8ʰ	5ᵐ	55ˢ.65
	Or in arc	121°	28′	54″.75

NAGASAKI.

The latitude of the Nagasaki station as deduced from sixteen observations of pairs of stars is N. 32° 44′ 32″.93.

	h.	m.	s.
Telegraphic difference of longitude between the Shanghai and Nagasaki stations	0	33	32.85
Longitude of the Shanghai station	8	5	56.14
Longitude of the Nagasaki station	8	39	28.99

To reduce the position of the station to that of the angle of the sea-wall at the northern corner of the custom-house a correction of + 1″.7 to the latitude and −0ˢ.37 to the longitude is required.

Applying these corrections, the result is—

Angle of sea-wall at northern corner of custom-house[1]	Lat. N.	32°	44′	34″.63
	Lon. E.	8ʰ	39ᵐ	28ˢ.62
	Or in arc	122°	52′	9″.3

YOKOHAMA.

The latitude of the Yokohama station as deduced from twenty observations of pairs of stars is N. 35° 26′ 23″.61.

	h.	m.	s
Telegraphic difference of longitude between the Yokohama and Nagasaki stations	0	39	7.77
Longitude of the Nagasaki station	8	39	28.99
Longitude of the Yokohama station	9	18	36.76

[1] The observation spot on Minage Point, being 3ˢ.78 west of the station, makes the longitude of Minage Point 8ʰ 39ᵐ 24ˢ.84, or in arc 129° 51′ 13″.

To reduce the position of the station to that of the flagstaff of the English naval storehouse a correction of $+10''.5$ to the latitude and $+0^s.14$ to the longitude is required.

Applying these corrections, the result is—

Flagstaff of English naval storehouse	Lat. N.	35°	$26'$	$24''.11$
	Lon. E.	9^h	18^m	$36^s.90$
	Or in arc	139°	$39'$	$13''.5$

WLADIWOSTOK.

The latitude of the Wladiwostok station, as determined by Colonel Scharnhorst, is N. 43° $6'$ $51''$.

	h.	m.	s.
Telegraphic difference of longitude between the Wladiwostok and Nagasaki stations	0	8	1.90
Longitude of the Nagasaki station	8	39	28.99
Longitude of the Wladiwostok station	8	47	30.89
Telegraphic difference of longitude between the Shanghai and Wladiwostok stations	0	41	34.82
Longitude of Shanghai station	8	5	56.14
Longitude of Wladiwostok station	8	47	30.96
Mean result for Wladiwostok station	8	47	30 92
Longitude of Wladiwostok station as determined by Colonel Scharnhorst	8	47	31.31
Difference between result of measurements by Siberia and by India	0	0	0.39

TABLE OF CORRECTIONS TO BE APPLIED TO THE SECONDARY MERIDIANS ADOPTED BY THE BRITISH HYDROGRAPHIC OFFICE IN JAVA, CHINA, AND JAPAN SEAS.

Place.	Longitude adopted.			Corrected longitude.			Correction..
	°	′	″	°	′	″	″
Batavia (Observatory)	106	48	7	106	48	37	+30
Singapore (Fort Fullerton)	103	51	18	103	51	15	− 3
Manila (Cathedral)	120	58	8	120	58	3	− 5
Hong-Kong (Cathedral)	114	9	38	114	9	31.5	− 6.5
Shanghai (British Consulate Flagstaff) .	121	28	26	121	28	55	+29
Nagasaki (Minage Point)	129	51	13	129	51	13	0.0
Yokohama (Hospital Square)	139	38	43	139	39	13.5	+30.5

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